AMERICAN
JOURNAL OF SURGERY

VOL. XXVII. MARCH, 1913. No. 3

DISEASES OF JOINTS AND BONE MARROW.

THE ANATOMY, PHYSIOLOGY AND PATHOLOGY OF BONES AND JOINTS, GENERAL CONSIDERATIONS.

LEONARD W. ELY, M.D.,
DENVER.

For a proper understanding of disease in bones and joints, a knowledge of their structure and function is necessary. Without this knowledge we are hampered in our study and are at the mercy of anyone who advances a therapeutic idea, no matter how absurd and fantastic. Not all that follows is as yet proved, but it represents the results of original investigation and clinical observation, and is submitted as a working hypothesis[1]. We shall confine our attention to the bones and joints of the extremities and of the spine[2].

Six tissues interest us, namely: 1, Bone tissue proper; 2, Marrow; 3, Periosteum; 4, Cartilage; 5, Synovia; 6, Ligament.

BONE.

Bone tissue is composed of lime salts and organic material, and is the same wherever it is found. It varies only in its arrangement and in its amount. It is divided into two classes, *i. e.*, dense or compact, and spongy or cancellous, but the bone in each is the same. Dense bone is found at the circumference of the shafts of the long bones[3], and generally as a layer on the outside of all spongy bones or portions of bone. The dense bone of the shafts does not suddenly cease on its inner aspect, but is replaced by a small amount of open-meshed bone. The trabeculae become scantier and gradually cease. In other words, the shaft of the bone is not to be regarded as an external layer of dense bone, filled with a cylinder of marrow, but as a mass of bone and marrow differing in their relative amount from the circumference to the center. All through this dense bone are marrow canals. As it approaches the extremities the layer of dense bone tapers off, ending at or about the line where the articular cartilage begins.

(1) See also MacEwen, Growth and Regeneration of Bone, The Macmillan Co., New York, 1912.

(2) The conclusions set forth are based, not alone on clinical experience, but on the examination of some 400 slides of bones and joints.

(3) The metacarpals, metatarsals and phalanges are classed as long bones.

Cancellous bone makes up the bulk of the ends of the long bones, and the bulk of the short and flat ones, the cranial diploë, the vertebrae, the sternum, ribs, carpus, tarsus, etc. A layer of it lines also the shafts of the long bones.

Bone tissue is not subject itself to inflammation or actively to disease, and simply reacts to disease or change of its contained marrow. Usually a mild irritation of the marrow causes an hypertrophy of bone, a stronger irritation an atrophy. If the inflammation in the marrow be very severe, it kills the bone mechanically by shutting off its nutrition. Heretofore in almost all bone diseases the custom of studying the bone tissue itself has prevailed, but this tissue is really of minor importance, like the walls of a factory in which are carried on various activities, like a honey-comb, or the shell of an oyster. The only function of bone is a mechanical one.

All bone is covered by a tissue with which it is intimately connected, that is, by the periosteum or by cartilage. An endosteum has been described as lining the canals and spaces of bone. Of course, anything within the bone is endosteum, but there is no special tissue to which this name should be given. Endosteum is simply marrow.

Constant change is going on in the bone, that is, its structure is always changing, and is adapting itself to the use to which it is put. If a part be put at complete rest, the bone atrophies, if great work is demanded, the bone hypertrophies, but both processes are passive, and are brought about by the action of the marrow and periosteum. In the long bones the bone tissue may be increased in amount in two ways, first by the ossification of cartilage, and second by productive osteitis. In the latter case the bone trabeculae are seen under the microscope to be edged by small, round marrow cells—osteoblasts.

Bone tissue may atrophy in one of two ways, first by absorption of lime salts—halisteresis—and second by a rarefying osteitis. In the latter case one sees, under the microscope, giant cells—megaloblasts or osteoclasts—lying in depressions in the bone trabeculae—Howship's lacunae—and eating the bone trabeculae away. When the bone has been killed by interference with its nutrition, these depressions can often be seen in the dead pieces,

but the giant cells are no longer in them. Sometimes on one side of a trabecula, osteoclasts are devouring the bone, and on the other side osteoblasts are laying down new bone. Dead bone is easily recognized by the absence of bone cells. Macroscopically dead bone is recognized by its roughness, its change of color, and by the fact that it does not bleed when divided.

MARROW.

Normal marrow is of two kinds, the red or lymphoid, and the yellow or fatty. The former is to be regarded as typical marrow. It consists of a reticulum of connective tissue, in whose meshes lie large numbers of most diverse cells. The derivation, function and destination of the cells are still only partially known[1]. Some are regarded as blood cells in embryo. The contained cells are what give this kind of marrow its name. Yellow marrow is marrow which contains much fat, and very few other cells. In old age the bone marrow undergoes a myxomatous degeneration.

Fig. 1.
Photograph of lower two-thirds of femur of young adult, frontal section. Observe the thin layer of cancellous bone internal to the dense cortex of the shaft.

In adults lymphoid marrow is found in spongy bone, yellow marrow in dense bone. In children lymphoid marrow is found in the shafts, but, as time goes on, it is replaced by fatty marrow. As has been said, the central canal of the long bones is filled with marrow, but so also is the dense bone of the cortex, to a less extent. Wherever there is bone there is marrow, and the marrow is not a passive filling for the bones, but their active constituent, building them up and tearing them down. In it can be discerned the customary evidences of disease. In tuberculosis it exhibits the classic tubercules, in active inflammation it shows engorgement of blood vessels, pus cells, colonies of bacteria, etc., in chronic disease peculiar appearances later to be described.

When we would find out why any disease locates itself where it does, we study the structure of the tissues in that locality. Thus, carcinoma often starts at a spot where the character of the epithelium changes, gonorrhea affects mucous membranes with a certain kind of cells. Following out this theory in bone and joint disease, if we recognize that the marrow is the essential factor in all bone diseases, and if we bear in mind the situations in which each kind of marrow is found, we shall readily understand why certain diseases affect the shafts of the long bones, certain others their extremities, and possibly still others, both shafts and extremities. We shall put aside such vague terms as "rapid growth predisposing to infection," "congestion following injury," and shall rather study the constituents of the marrow at various periods of life, and their vulnerability to certain kinds of infection.

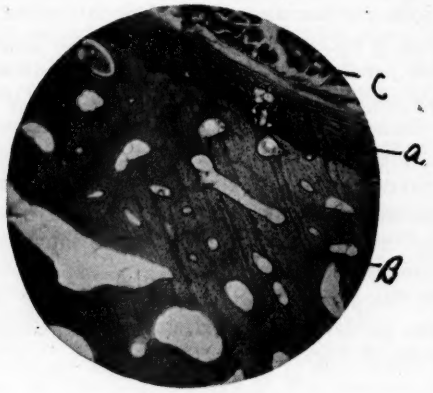


Fig. 2.
Low power photomicrograph. Normal bone and periosteum of lower metaphysis of adult femur. A—periosteum, B—bone, C—muscle. Note bone cells—small black spots in the bone and the character of the bone near the surface.

THE PERIOSTEUM.

The periosteum is composed of two layers, an inner or cellular, and an outer or fibrous layer. The inner, very thin in adults, thicker in children, bears a strong analogy to the marrow of the subjacent bone, has similar functions, and is vulnerable to the same diseases. It is to be regarded as a layer of marrow on the outside of the bone, and is not separate or distinct from the marrow on the inside. (See Fig. 2.) The two communicate by small channels or canals in the bone. Both nourish the

(1) See W. E. D. Dickson, The Marrow, etc., 1908. Longmans, Green & Co.

bone tissue. This is the reason why, when we strip the periosteum from the bone in operations, the bone does not die, but when the periosteum is stripped off and raised up in acute osteomyelitis, the bone usually dies, because its nutrition has been cut off by a simultaneous inflammation in the "internal" marrow.

The outer layer of the periosteum serves as an envelope for the bone, and may be disregarded except for its mechanical function.

At the ends of the long bones, where the joint cartilage begins, the fibrous layer of the periosteum is continuous with the ligament. For our purposes the inner layer may be regarded as continuous with the synovia.

Fig. 3.

Photomicrograph of section from a case of acute suppurative arthritis of knee. T—bone trabeculae, along whose margins is a row of osteoblasts, showing proliferative osteitis. C—colony of pus cocci in a blood vessel.
Zeiss apochromatic 16 m.m., ocular 4. Tube length 49 cm.

Fig. 4.

Photomicrograph of a section from a case of acute suppurative arthritis. T—trabecula; M—marrow. Most of the trabecula is dead, but its upper left hand and lower right hand borders show evidences of a productive osteitis and a deposit of new bone. At R. a piece of the trabecula is seen to have been eaten away by the osteoclasts lying in their lacunae. The dead bone is distinguished by the absence of bone cells. The marrow is the seat of an intense inflammation.
Zeiss objective 16 m.m., ocular 4.

THE JOINT.

We now come to a consideration of the joint, and shall take for our example a simple joint between the ends of two long bones. All others are only modifications of this.

A joint is a closed cavity between two bones, bounded by two tissues, the cartilage and the capsule. Where one begins the other ends.

Cartilage may be regarded as bone in embryo and in potentiality. It is composed of cells and basement substance. The latter appears to be homogeneous, but this homogeneity, due to its cement substance, is only apparent. If the nutrition of the cartilage is disturbed, or if the joint be put at rest, the real fibrous nature of the basement substance becomes evident. Deep in the cartilage the fibres are at right angles to the surface, but more superficially, parallel to it. I have never been able to identify a perichondrium of an articular cartilage.

These fibres in the cartilage have often been mistaken for layers of fibrin in diseased joints. The importance and frequency of fibrin deposition in diseased joints has probably been exaggerated. A substance is occasionally seen precipitated on the surface of the synovia, that looks like fibrin, but does not take the fibrin stain, though in hemorrhagic joints fibrin is a natural constituent of the exudate.

The cartilage, like the bone, draws its nutrition from the marrow directly beneath it, and probably also, at the sides from the synovia (or periosteum). It contains no blood vessels of its own. Its role in disease is still a matter of debate. Some authorities maintain that it is subject to inflammation, others that it is not. Some ascribe to it a principal part in chronic joint disease. My personal opinion is that its role is largely a passive one. The only sign of activity I have been able to distinguish is a proliferation of its cells. The deposit in it of crystals of biurate of soda in gout is really a passive process. Mysterious chemicals floating in the blood stream must not be regarded as affecting the cartilage in any way. No fluid in the joint can have any effect upon it whatever.

The joint cartilage forms an absolute barrier against the extension of disease from the bone into the joint, and *vice versa*, until it has been perforated by the cutting off of its nutrition.

Until this perforation takes place the only method of extension must be at the periphery of the cartilage, where the inner layer of the periosteum is continuous with the synovia. Much the same may be said of the epiphyseal cartilage.

The joint cartilage atrophies and hypertrophies very much as do the bone trabeculae, namely, as the

result of disease in the bone marrow. In addition, the cartilage reflects changes in the synovia. Only on this hypothesis of the passive role of the cartilage can the changes in it be explained.

THE CAPSULE.

This, as we have seen, is to be viewed as the continuation of the periosteum, and, like it, consists of two layers, an inner or cellular, and an outer or fibrous layer. The former is known as the synovial membrane (or synovia), the latter as the ligament, but there is no sharp dividing line between them. They are not separate structures, in point of fact. The inner is simply a differentiated, cellular layer. For the purpose of study, however, it is well to regard them as distinct, for their reaction to disease is entirely different. The synovia is active, the ligament passive. As far as their reaction is concerned, the synovia is marrow, the ligament is periosteum.

THE SYNOVIA.

The synovia, defined by Quain as belonging to the lymphatic system, is, in its simplest form, a layer of round cells lining the capsule of the joint. It is not a true pavement endothelial membrane like the peritoneum. For much of its extent it is smooth, but in the recesses of the joint it is thrown into folds or villi, and has the appearance of epithelium. In synovial inflammations the round cells proliferate, sometimes enormously, and the synovia may undergo a general villous proliferation. The proliferation is to be regarded as the response of the synovia to an irritation. It may take place as the result of disease in the membrane itself or of any mechanical irritation in the joint cavity. It then consists of a thick instead of a thin layer of cells, and resembles typical lymphoid tissue. Such a proliferation is found in tuberculosis, and in certain other infectious processes.

A significant characteristic of the synovial membrane is the presence of lymph spaces in the connective tissue beneath.

The opinion formerly prevailed that the synovia was a closed sac, extending out over the cartilage, but this is not a fact. It is a section of a tube, ending at the border of the joint cartilage, with which it is, to a certain extent, continuous. The structure of one gradually shades off into that of the other. If one extends, the other recedes. When the joint is immobilized, the synovia encroaches on the cartilage, as if automatically to obliterate the joint, but the joint is never actually obliterated thus, unless the cartilage be destroyed by disease. Probably no "adhesions" form, strictly speaking, in a normal joint that is immobilized for any reason. Ankylosis, in other words, is never caused by immobilization, but by the disease or injury for the treatment of which the immobilization is used.

In all operations on joints or in wounds of them, it is the reflection of the synovial membrane that is to be feared.

THE LIGAMENT.

We have already discussed the ligament. It is composed of dense fibrous tissue, holds the ends of the bone together, checks motion, and may be disregarded except for its mechanical functions.

We recognize, then, in bones and joints three active tissues, namely, the marrow, the synovia, and the inner layer of the periosteum; and two passive tissues, the bone and the cartilage. The active tissues are continuous with one another and present similarity in structure and in their reaction to disease. The disease may start in one and spread to another. Certain diseases show a predilection for one, certain for two, and certain affect all three. Thus, "acute articular rheumatism" affects the synovia, syphilis the periosteum, the marrow, and rarely the synovia, gonorrhea, the synovia, and rarely the marrow and the periosteum, tuberculosis and pus infections all three. The bone and the cartilage are continuous with each other, and their reaction to disease is similar also. They form the stroma, the others the parenchyma. The bone is the honeycomb which the bees have built up. As for the ligament and outer layer of the periosteum, they are the hive with which neither the bees nor the honeycomb have any active connection.

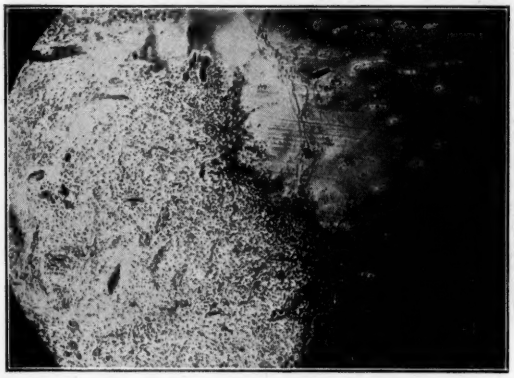


Fig. 5.

Photomicrograph of bone and cartilage: from a section of an acute purulent arthritis, following operation on a case of suppurative inflammation of the shaft of the tibia. Degenerating cartilage on the right. Bone marrow on the left. Observe how the inflammatory process in the marrow is eating its way into the cartilage, and how it has already consumed most of the bone. Only a few small bone trabeculae are left. Zeiss apochromatic 16 m.m. Ocular 4. Tube length 49 cm.

It must never be forgotten in dealing with bones that the morbid processes in them run their course in the marrow, locked up in a firm rigid case or

cell. The effects of the disease are made manifest upon this shell, but one must not make the error of regarding these effects as the disease itself. Again, after an acute disease has run its course in the bone marrow, healing may be prevented by the mechanical obstruction afforded by the dead bone shell.

Certain joints have a structure more complicated than that we have described. Several bones may enter into their formation, or they may contain pouches and intra-articular ligaments. The intra-articular ligaments are covered by a synovial membrane, which passes in from the side of a joint, but not over the cartilage. Folds of the membrane also pass across various joints, and in certain diseases these folds partially divide the joint off into pockets or compartments.

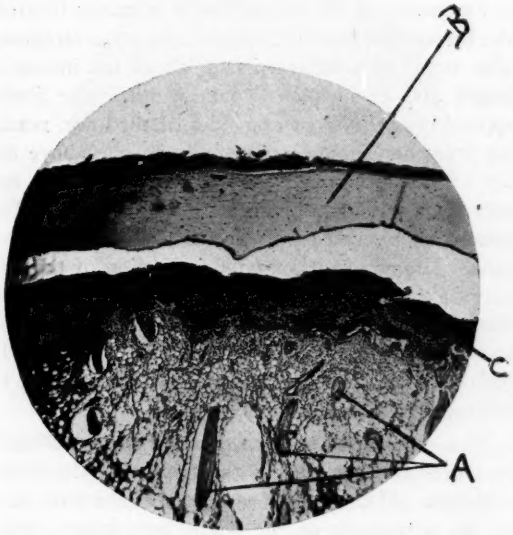


Fig. 6.

Photomicrograph showing tuberculosis of the marrow (C) directly beneath the cartilage (B). The cartilage has been lifted (B). The cartilage has been lifted off *en masse*, and its surface is fibrillated. A—bone trabeculae.

In the joints of children the epiphyseal cartilages may influence the spread of disease. They serve as a barrier to protect the joint from invasion in disease of the shaft or of the metaphyses[1], and *vice versa.*

Let not the "practical" surgeon dismiss the study of bone and joint pathology as not worth while. It is the most practical side of our subject. In those regions where it is neglected, the proportion of one-armed and one-legged persons will be found very high. The attempt to advance medical knowledge by means of clinical experience is like that to accumulate a fortune by speculation—*successful once in a while.*

(1) Metaphysis is the name given to that part of the expanded end of the long bones between the shaft and the epiphyseal line.

ACUTE ARTHRITIS.

By acute arthritis we mean an inflammation of the synovial membrane of the joint. In certain forms, as we shall see, this may be accompanied by an inflammation of the marrow of the bone ends entering into the formation of the joint. To separate acute from chronic inflammation is not always an easy task. It seems that in these lymphoid tissues, as in others, an acute inflammation may occur, and may persist until the cause of it is removed. Any sharp division is not practicable. Some cases are hard to classify properly.

Etiology. Two main classes are immediately apparent, i. e., traumatic and infectious, and they differ so radically that they merit separate descriptions.

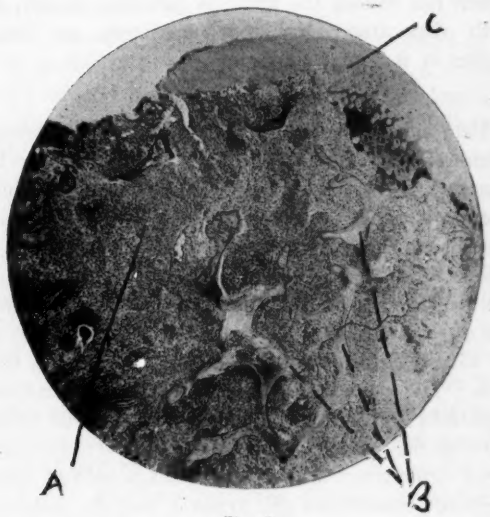


Fig. 7.

Photomicrograph showing intense tuberculous inflammation of the marrow (A). B—dead bone trabeculae. C—degenerating cartilage. The inflammation is making its way into the marrow at the margin of the articular cartilage, destroying the bone and cartilage as it advances. Low power.

TRAUMATIC ARTHRITIS.

Under this head we shall consider all cases of joint inflammation caused by sprains, "strains," contusions, or by abnormal bodies in the joint, e. g., displaced fibro-cartilages, "joint mice," hypertrophied fringes. Absolutely clean penetrating wounds are also to be considered among the causes. An arthritis accompanies dislocation and intra-articular fractures, but sinks into insignificance as compared with the causal lesion.

MORBID ANATOMY.

The changes in the joint are the result of the presence of the fluid poured into its cavity from the wound in its capsule. This fluid may be serous or hemorrhagic. If the latter, then flocculi of

fibrin may later be precipitated. The synovia is injected, reddened, and often succulent and thickened. More or less villous proliferation may be present as the result of irritation. If the joint be immobilized for any length of time, the articular cartilage may become somewhat fibrillated in its structure, and possibly the synovia may encroach upon it at its border. These are the essential features of the process. As long as no infection is added, the bone is usually not involved in the inflammation. Fractures and dislocations have their own pathology, which will not be discussed here. If the bone ends be injured, an aseptic necrosis of the bone and cartilage may be initiated, that possibly may be the starting point of a chronic joint diseases[1], otherwise I do not believe that a chronic process ever results, unless the injury which has caused the arthritis continues to act, as with dislocated semi-lunar cartilages or loose bodies in the joint.

SYMPTOMATOLOGY.

Pain and restriction of function are the cardinal symptoms. The contour of the joint is wont to be changed, if the joint be superficially located. Fluctuation is easily detected in certain joints, e. g., the knee and elbow, with more difficulty in certain others, e. g., the hip and ankle. The whole pouch on the front of the knee may be distended, causing the patella to float. In the elbow fluctuation is to be sought posteriorly at the sides of the triceps tendon. The pain is made much worse by motion, especially by motion which puts the injured structure on the stretch, and by pressure over the damaged structures. Usually the joint is held in semi-flexion. Sometimes the synovia may be sensitive wherever it is accessible to the examining finger.

Ecchymosis is rare unless a fracture is present. The fracture may consist of the tearing off of a very minute spicule of bone.

The *prognosis* as a rule is good, unless the bone has been damaged. If the exudate have been hemorrhagic, some adhesions may remain as the result of the precipitation of fibrin. Usually the fluid is slowly absorbed, and the joint returns to its normal state.

The diagnosis is usually a simple matter. The symptoms supervene immediately on an injury, or a few hours later. The main thing to establish is that the joint was absolutely normal at the time of the trauma, in order that we may exclude a disease which has simply been aggravated by it. The second essential is to exclude fracture by careful examination and by an *x*-ray plate.

(1) Vide Axhausen, Archiv für klinische Chirurgie, Sept., 1912.

TREATMENT.

The first indication is to restrict as much as possible the formation of the exudate in the joint, especially in a joint that has a capacious cavity, like the knee. This we do by pressure, strapping, bandaging on a splint, etc. Heat and cold are also useful. These measures need not be continued more than a few hours. Later the most important principle is rest, not necessarily rest for the whole joint, but rest for its damaged part. In the later stages, massage, baking, etc., may be necessary, but very rarely are.

The *knee* is usually damaged in its lateral ligaments, especially the internal, and *when it is in flexion*. Therefore our chief concern, after the acute symptoms have subsided, is to keep the joint in extension, in which position it is rarely injured. We accomplish this by diagonal criss-cross strapping with strips of adhesive plaster about ten inches in length and an inch or two in width, quite firmly applied over the front and sides of the knee, reaching from a point below the joint to one above the top of the quadriceps pouch. This strapping not only prevents flexion, but also exerts pressure. The patient is allowed to go about, preferably with a cane. His comfort is a good indication of the efficacy of the treatment. If he suffer pain the treatment is not sufficient. In the severer cases, we may be compelled to immobilize the joint at once. In such case subsequent massage and baking will be more frequently necessary.

If a semi-lunar be torn, we try these palliative measures for a while, in the hope that the lesion will heal. If the injury recur often, the torn piece of the semi-lunar or the whole semi-lunar should be removed. There are undoubted cases of damaged semi-lunar cartilage, however, that have ceased to occasion trouble even after years of recurrent attacks, and the knee joint should never be lightly invaded with a knife. If the patient be averse to an operation, a Campbell brace may be applied, allowing about thirty degrees of flexion—enough for comfortable locomotion, but preventing side strain.

A sprained ankle is usually caused by a twist of the foot inwards, damaging the external lateral ligament. The treatment is simple and most satisfactory with the well-known Coterell strapping. The foot is held in dorsal flexion and abduction. The plaster, torn into strips about one inch wide, and of two different lengths, is to be ready at hand. The first strap starts just behind the metatarso-phalangeal joint of the little toe, runs around behind the heel and ends about the middle of the inner side

of the foot. The second starts about the middle of the outer surface of the calf, passes down the leg, under the heel, and ends at about the level of the internal malleolus. The third overlaps the upper half of the first, the fourth the anterior half of the second, and so on until the external surface of the ankle and foot is covered. Finally the strapping is reinforced by short strips in various directions over the injured ligament and over the heel. The patient usually walks with comfort on the next day.

If the ankle be sprained frequently, the foot should be strapped at right angles in extreme dorsal flexion, for the joint is not very vulnerable to a twist unless it is in plantar flexion.

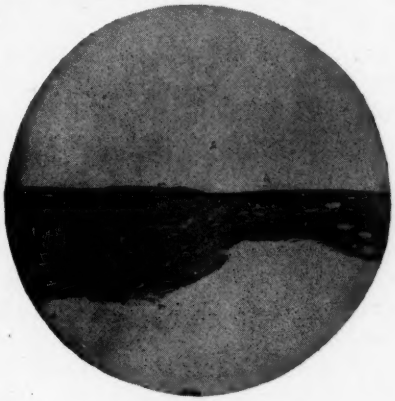


Fig. 8.

Capsule of a normal knee joint, low power. Joint surface above. Note the vascular spaces. Zeiss, objective aa. Ocular 3.

Two long, wide strips pass from the upper part of the leg, down its external aspect, under the sole and up the inside. Over them a figure-of-eight is applied to the ankle with a narrow strip of plaster. The patient wears also a long, broad heel and a broad sole.

The elbow suffers rarely from traumatic arthritis, and is difficult to strap satisfactorily. A better plan is to put the forearm in a sling.

Criss-cross narrow strapping put on diagonally over the shoulder, usually avails to relieve the discomfort in mild cases of inflammation in the joint. The possibility of the presence of a Duplay's bursitis must not be overlooked[1].

A broad circular strap does well for arthritis in the wrist. If the sensitiveness be in the region of the carpal navicular, a skiagram of both wrists should be taken to rule out fracture of that bone.

Strapping is difficult to apply in the hip also. Probably rest and massage are our best expedients. If the inflammation be very severe, a short plaster of Paris spica may be necessary.

(1) Codman, Boston Medical & Surgical Journal, May 31, 1906; May 18, 1911, etc.

Finally, let a word of caution be said. If a supposed case of simple traumatic arthritis does not completely heal up in a few weeks, a diligent search should be made for the reason. It is most unwise to lull ourselves into a false security with a diagnosis of "rheumatism."

THE SPINE.

The joints of the spine are occasionally the seat of a traumatic arthritis, and the inflammation gives rise to what is generally regarded as lumbago. Lumbago is usually nothing more than a chronic sprain or "strain." The pain may be in the nature of a dull ache or of a "catch." If the lesion is a severe one, some lateral curvature may be present. Strapping, massage or ironing out with a hot flat-iron over several layers of blanket will usually give relief. If the symptoms persist, a light spinal brace may be worn in addition.

A traumatic arthritis of the lumbar spine or of the sacroiliac joint may be the cause of a sciatica. The treatment is much the same as for lumbago. If the sacro-iliac joint is subluxated, the displacement must be reduced. "Idiopathic" sciatica is very rare, if it ever occurs.

HEMOPHYLIAC JOINTS.

These should really be classed with diseases of traumatic origin. Probably as the result of a slight joint injury in a person of the hemorrhagic diathesis a bloody effusion is poured out into a joint, and the changes in the joint tissues are due to mechanical irritation by this effusion. The synovia proliferates, sometimes enormously, and its internal surface may be shaggy with the enlarged synovial villi, branching like moss on a rock. Later the precipitation of fibrin from the exudate gives rise to dense and firm adhesions. The joint may be puffed up like a balloon, as one patient expressed it. It fluctuates, and sometimes crepitates softly. Pain is usually insignificant. The chief complaint is the interference with function by the fluid.

A sudden, fluctuating, comparatively painless swelling of a joint, following a slight injury, should always awaken a suspicion of hemarthrosis, and should instigate a search for a family history of "bleeders."

Treatment: Rest, pressure and cold applications constitute the local measures. Injections of horse serum, in case of need, diphtheria antitoxin, rabbit serum, and normal human serum have their advocates. Direct transfusion of human blood has also been tried with success[1].

(1) Steele, Yale Medical Journal, 1910-11, XVII, 326.
Wells, Boston M. & S. J., 1911, 716.
Moss, Johns Hopkins Hospital Bulletin, 1911, XXII, 272.
Weil, Presse med., 1905, XIII, 673.
Welch, Am. Journ. Med. Sciences, 1900, 800.
Lambert, Med. Record, 1908, Vol. 73, 885.
Murphy, Boston Medical & Surgical Journal, 1908, 865.

In the late stages, when fibrous adhesions have formed, unless we are sure of our preventive measures against a recurrence of the hemorrhage, no mobilizing operations should be undertaken.

SCURVY-SCORBUTUS.

While not, strictly speaking, a joint disease, scurvy is akin to the preceding, and merits a few words here. As one sees it in civilization this disease occurs with a moderate frequency in bottle-fed infants, especially in those fed on sterilized or condensed milk. It causes hemorrhages beneath the periosteum, usually near the joints, manifest by exquisitely painful swellings. The child screams with pain when it is moved. Hemorrhages into the skin and mucous membranes, and swollen, bleeding gums may accompany the bone symptoms.

The treatment, eminently satisfactory, consists of giving raw milk, beef juice and fruit juice.

GOUT.

Gout is really a form of traumatic arthritis, caused by the deposit in the articular cartilage of uratic material. The acute inflammation is the reaction of the synovia against the foreign material. Gout usually affects the metatarso-phalangeal joint of the great toe, comes on in attacks, and has its well-known constitutional symptoms and often its chalky deposits in other parts of the body, especially in the external ear. The poorly marked cases may occasion confusion with mild infections.

The treatment of gout belongs for the present in the domain of internal medicine.

(To be continued.)

IMMOBILIZATION OF JOINTS.

In the treatment of any joint disease the practitioner cannot know with absolute certainly until the disease has been cured whether the joint is going to be absolutely stiff, or somewhat stiff, or have normal or practically normal motion. Therefore the first orthopedic principle in the treatment of all diseased joints is to put the limb in such a position that it will be functionally most useful to the patient in case it is stiff when cured, and to maintain it in that position. The limb should be put into the desired position as rapidly as possible; while the disease is still active, and before healing has commenced, for changing the position after healing has commenced delays the cure and in many conditions adds to the risk to the patient. —T. RIDLON in *The Chicago Medical Recorder.*

MILITARY SURGERY.

GUSTAVUS M. BLECH, M.D.,
CHICAGO, ILL.

I.

INTRODUCTION.

In time of war—and no one can predict when such a calamity may become a reality—the medical corps of our defensive forces, regular as well as volunteer, will prove inadequate numerically to cope with the resulting contingencies, especially so if our antagonist be a first-class military power.

It is, therefore, the patriotic duty of every able-bodied practitioner of medicine to so prepare himself in time of peace that, should the nation ever call on him for service in the field, he will be prepared to render valuable services wherever placed in a professional capacity.

Experience has shown that the civilian surgeon, no matter how skilful a diagnostician and operator he may be, does not prove a useful military surgeon immediately after assignment to duty.

This is due to a lack of familiarity with military organization and surgical conditions as they present themselves on the battlefield, on the lines of communication and in the immediate rear of the army and navy.

In order to appreciate the difference between civil and field surgery it must be borne in mind that every war represents a "traumatic epidemic." The casualties may be enormous in number for certain periods and localities—or even throughout the entire "front," hampering the movements of the combatants. The medical service is not only charged with the treatment of the individual sick or injured soldier, but is entrusted with the duty still more important—from a strategic point of view —of removing the incapacitated to the rear—the so-called evacuation service.

Surgical therapy must not conflict with this last-named service. In fact, every consideration is but secondary to the main purpose of winning the battle. The will of the commanding general is supreme. War is synonymous with great personal sacrifices upon the altar of patriotism. The surgeon, as will be seen later on, must save life whenever and wherever possible, but in a manner prescribed for him by higher authority. Except in home territory, safe from contact with the enemy, individualization, the pride and glory of the scientific surgeon in civil life, is out of place. The "massive" or, if you please, "wholesale" character of the injuries to be treated requires a "wholesale" system of attention—pattern-like, if needs be.

If we further consider that the nature of injuries encountered on the battlefield are not met with in time of peace, arms and projectiles differing considerably from the revolver and rifle handled by civilians; if we further realize that ofttimes the surgeon may find himself handicapped by the absence of such equipment he has come to look upon as essential for successful work in his office, dispensary or operating room, we will realize that there must exist some difference also from a purely technical standpoint.

The above remarks must suffice for the present to prove a raison d'être for the subsequent chapters.

For the sake of completeness let me add that every one in the medico-military service should be a good sanitarian, familiar with the interpretation of military maps, with the principal customs of the service and the articles of the Geneva Convention.

II.

ORGANIZATION.

In order to appreciate the need for and the characters of the medical service organization in the field, it is essential to take a glance at the organization of the line.

It does not fall within our scope of study to investigate the method of organization of our defensive forces in time of peace. What we are principally concerned with is the manner in which such forces will be organized in time of war. As far as the army (land forces) is concerned, definite regulations providing for very large numbers of troops have been provided. It will be sufficient, however, to become familiar with one great strategic and administrative military unit—the division.

The division is complete in itself, that is to say, it is so organized as to be capable of conducting a military campaign without dependence on outside assistance. It has a total of about 20,000 officers and men (in round figures) and consists of infantry regiments (9)—1 regiment of cavalry, 2 regiments of field artillery, 1 engineer battalion, 2 companies of signal troops, and the requisite personnel to man the ammunition, supply, bakery and pack trains.

The medical personnel and organizations forming part of the division will be discussed somewhat in detail later on.

Even a tyro must realize that one single division amounts to very little in a serious campaign against a first-class enemy, commanding the services of a million men capable of bearing arms. Our own little regular army consists of four divisions, to which could be added five to six divisions of state troops (National Guard). Even these ten divisions could serve only as a sort of buffer until several hundred thousand citizens can be organized, drilled and equipped for service in the field.

The navy, on the other hand, cannot easily be expanded after hostilities have begun—one of the strongest arguments for a large and efficient navy in time of peace.

It may not be amiss to state here that in the event of war, two or more divisions are united under one commander to form a "field army," and that two or more field armies can be united to form a territorial army, e. g., Army of the Cumberland.

Medical Directors of Armies (territorial and field) are, of course, the ones to direct medical activities of the chief surgeons of divisions and these in turn are responsible for the efficient service of the entire sanitary personnel attached to each division.

The medical service consists of commissioned officers (ranking from first lieutenant to brigadier-general), to which none but regular graduate physicians can be admitted, and of under personnel commonly referred to as hospital corps men (laymen) ranking from private to sergeant 1st class. This under personnel have been trained in the application of first-aid, in the handling of wounded and sick for transportation, in nursing, in the preparation of drugs, dressings, etc., in short, as male nurses.

Each regiment has four medical officers and 24 under-personnel.

The engineer battalion has 3 officers and 9 men.

The signal troops have 2 officers and 6 men.

The artillery brigade (2 regiments) has 6 officers and 42 men (3 officers and 21 men to each regiment).

These regimental sanitary officers and men accompany each regiment or smaller unit on the march, in camp, and to the very firing line, and will therefore be charged with the very first aid to be given the wounded. Accordingly they also constitute the first line of relief.

Each division commands the services of four (4) so-called *field hospitals.* A field hospital consists of 5 medical officers and men. It has tents, beds, surgical equipment, etc., for 108 patients, though this number can be enlarged if need be, especially so if the hospital be established in the houses of a village or town, instead of tents in the open field.

These hospitals are placed a few miles to the rear of the firing line—out of the danger zone—and must be able to follow the movements of the division. They are very mobile institutions, temporary in character, and while capable of better aid than can be administered on the firing line, they cannot undertake surgical operations of a facultative character. Emergency operations, a little needed rest

and refreshment, better dressings and fixation of fractures—this is about the scope of the activities of the field hospitals, which, for our purposes, would designate the second line of relief.

Between the field hospitals and the aid stations established by the regimental sanitary personnel, the so-called *ambulance company,* of which the division has four, forms the connecting link. The ambulance company, as its name implies, has the function of conveying wounded and disabled men wherever its services can be best utilized, especially between the front and the field hospitals. It has also the task of establishing *dressing stations,* somewhat in the rear of the regimental aid stations, where, if the ground has been well chosen to insure cover against missiles, more time may be taken to properly administer first aid, and even to perform life-saving operations (e. g., tracheotomy, ligature of severed bloodvessels, etc.), and where a proper classification of patients into slightly wounded, severely wounded, etc., should be begun to properly systematize the disposition of the patients (retention for a short time, return to the front, evacuation to field hospitals or even further to the rear, etc.).

Simple as this all appears on paper, let it be understood that the task of organizing these dressing stations may become one taxing the ingenuity of even the least trained medical strategists. A knowledge of the terrain, an appreciation of the general situation of the combat, such as whether the enemy is to be attacked, whether our side is only to defend itself, whether a forward movement or retreat is to occur, whether railroads, wagons, ambulances, good roads, etc., are available—all these are problems that must be considered. Space forbids entering into details, and those who appreciate the value of these great problems will do well to acquaint themselves with some of the specialistic works published on the subject (see bibliography).

Nor should the patriotic reader satisfy himself with the thought that he could not possibly be called upon to answer such questions and that it will be enough if he fulfill the duties of an operating surgeon at the less mobile or permanent institutions which every army maintains in its rear (see below). Our entire regular army has at present but four field hospitals and four ambulance companies—75% short of war footing. It is continually short in medical officers. The same holds good for the National Guard. What will happen if an army of say 300,000 (about 15 divisions) would have to be recruited, one can easily imagine.

After this deviation we shall consider the third line of relief—the so-called *evacuation* and *base* hospitals.

Evacuation hospitals, of which each division has two, are better equipped field institutions for 324 beds. If we omit the better equipment, an evacuation hospital really represents 3 field hospitals, established further in the rear. One section may relieve a field hospital. Another may be transformed into an isolation institution should exigencies require. Although a mobile institution, surgical treatment that will not require too prolonged a stay can be undertaken here. Somewhat better opportunities for corrective and other facultative surgery is afforded by the

Base hospitals. Each division has one. Capacity 500 beds. It is less mobile than an evacuation hospital and resembles much more the permanent civil and military hospitals in home territory, as far as surgical possibilities are concerned.

The distances between the diverse relief institutions may vary according to situation. The long transport of wounded and sick requires that something be done for the sufferers not conveyed in regularly appointed hospital trains.

This is accomplished by establishing so-called *rest-stations* where food and drink can be supplied and other urgent aid given along the lines of communication. Usually this will be administered by organized units of the Red Cross, an organization that is recognized as the official auxiliary volunteer medical service. As at this time the War Department has not yet completed definite regulations for this exceedingly valuable organization, something may be said about it at the conclusion of this serial.

While the following classification is not absolutely correct for purposes of therapy, and to save space when subsequently discussing surgical technics, we shall adopt the Roman figures I, II and III to indicate:

I. Very mobile aid stations (regimental, dressing stations).

II. Mobile (field hospitals).

III. Semi-mobile (evacuation and base hospitals).

III.

TRANSPORTATION OF WOUNDED.

As will be seen later on, the surgeon must know something of the transportation of wounded and disabled.

The problem of transportation is in itself one of utmost importance. The inadequacy of suitable transportation means cost many a Russian soldier's life during the recent war with Japan, and, indeed, it is often more humane to allow wounded soldiers

to fall into the hands of a civilized enemy than to risk lives merely to be able to report "all wounded promptly evacuated."

The transport problem begins at the very point where a soldier has fallen, for, as has been seen, the regimental aid stations are situated in the rear of the battle line.

Let us review the available methods of transportation:

(1) Litter.
(2) Travois.
(3) Ambulance—horse drawn.
(4) Ambulance—motor.
(5) Improvised litters, ambulances, etc.
(6) Hospital trains.
(7) Ordinary trains.
(8) Freight cars.
(9) Hospital ships.
(10) Ordinary ships or large boats.
(11) Aeroplane.

Ad. 1. The *litter* is the ideal means of transportation for short distances. Patients who are so gravely injured as to forbid almost any kind of motion can be safely conveyed on this method of transport. In principle it consists of two long poles, terminating at each end into a handle, held apart and rigid by folding transverses, to which a piece of ducking material is fastened. This forms the bed proper and is taut, yet elastic enough to adopt itself to the human body. The litter in vogue in the regular army, though it has a good many advantages, is far from being ideal. It is rather heavy, has short, flat stirrups to replace "feet" and does not allow of rapid interchange of the ducking, so that a blood-stained or otherwise soiled and infected "bed" will require a good deal of trouble for cleansing and disinfection. An ideal litter should be light in weight, easily separated for purpose of disinfection and, in a pinch, serviceable as a comfortable bed. As foreign armies have adopted some such scheme it is incomprehensible why our otherwise wide-awake army has ignored this important detail.

Ad. 2. The *travois* consists of two very long shafts, fastened by two transverses, to which latter a litter is fastened. A horse is hitched to the fore part of the shafts the same as to any ordinary buggy. The rear ends glide on the ground. To avoid jolting one shaft is slightly longer than the other. On more or less even ground, especially over prairies, meadows, or sand-covered ground, patients not too severely wounded can be transported over comparatively long distances. One horse and one attendant, who must also act as driver, are essential.

Wheels can be fastened to the rear ends of the shafts, though recent tests have not established their superiority.

Ad. 3. A military horse-drawn *ambulance* resembles a good deal the typical civil ambulances seen in cities and towns, except that it is arranged to accommodate four litters. One additional patient can be taken on the driver's seat. Instead of the four recumbent patients, eight can be carried in the sitting posture. Two, four or six horses or mules may be needed for such a vehicle.

Ad. 4. An ambulance driven by motor power, like an automobile. By a proper arrangement a much larger number than is now possible in the newly adopted army motor-ambulance could be carried, say 12 patients, but such an arrangement could be utilized only in warm weather.

Ad. 5. Litters and ambulances can be improvised in many ways. Many pages could be devoted to this interesting theme without exhausting the subject. Much will depend on the material available. As an example, an overcoat, a blanket, a large bag, two uniform coats, an old discarded tent, etc., could be slipped over two long poles and render good service as a litter. Any vehicle could be transformed into an ambulance by fastening four wooden strips in such a way to allow suspension of one or more litters. Heavy springs would be ideal for such a purpose and transport columns should carry them in their kits. Where these are not to be had, resiliency may be secured by twisting heavy cords with loops at the ends.

Ad. 6, 7 or 8. Regular *hospital trains* are arranged to accommodate 200 patients and the needed personnel for their care. Some nations have one car equipped as a regular operating room. As hardly any operation can be done while a train is in motion, and as no patients should be transported who may need operative therapy of magnitude before reaching the next institution, they are not essential. That ordinary passenger coaches can be utilized by some alterations to serve as sanitary trains, requires no proof. But even freight trains could be modified to serve such a purpose. For details the reader is referred to special works.

Ad. 9 or 10. Hospital ships are especially constructed for the accommodation of 200 patients. Any ordinary steamer could, of course, be utilized, especially for comparatively short distances. All that has been said in the previous section holds good, to a certain extent, for ships also.

Ad. 11. The use of the aeroplane as a transport medium is being experimented with by French army surgeons. It would be a dangerous method if detectable by the enemy.

Finally, in calculating the problem of transportation, it must not be forgotten that many slightly wounded, or those wounded in the upper extremities, can walk with or without assistance or ride on horseback, especially when relieved of their arms and accouterments.

(*To be continued.*)

THE OPERATIVE TREATMENT OF CANCER OF THE BREAST.

ALFRED DE ROULET, M.S., M.D.,
Clinical Professor of Diseases of Women in the Medical School of Loyola University,
CHICAGO.

At the present time radical operation is the only treatment for cancer of the breast offering slightest hope of permament relief. All other forms of treatment are at best palliative and their employment in any but hopeless cases cannot be too strongly condemned. There are few surgeons who are not familiar with the results of wasting precious time on such methods while the cancer relentlessly progresses from possible curability to absolute hopelessness.

Even the radical operation is usually futile in the presence of

(a) Fixation of tumor to skin or chest wall,
(b) Ulceration or extensive infiltration of overlying skin,
(c) Extensive involvement of axillary glands,
(d) Palpable invasion of supraclavicular glands,
(e) Visceral or osseous metastases,
(f) Involvement of both breasts.

These contraindications are not absolute, as occasionally a radical operation, done it is true, with little or no hope of cure, is followed by long periods of complete relief.

In early favorable cases, the results of operation depend almost entirely on the timeliness and thoroughness of the operation. When the cancer is still localized in the breast or in tissues which can be removed, its permament disappearance may be expected. Within reasonable limits the wider the dissection the more certain the result, provided always that the dissection follows the path of the extension of the cancer.

The investigation of such men as Stiles, Handley and Heidenhain have demonstrated that cancer spreads centrifugally by cancerous permeation of all adjacent lymphatics, and by embolism when permeation has extended from a small lymphatic into one of larger caliber.

The greater part of the mammary lymphatics pass directly into the larger vessels of the deep fascial (pectoral) lymph plexus, these vessels converging to enter the axillary glands. Heidenhain's researches showed, in 12 of 18 cases studied, cancerous lymphatics passing from the breast to the pectoral fascia. This cancerous permeation of the underlying lymphatics occurs long before fixation of the tumor to the skin or chest wall and before there is any appreciable involvement of the axillary glands. As a matter of fact, the axillary invasion is second to the fascial infection, particles of cancer tissue being carried along the lymph stream to these

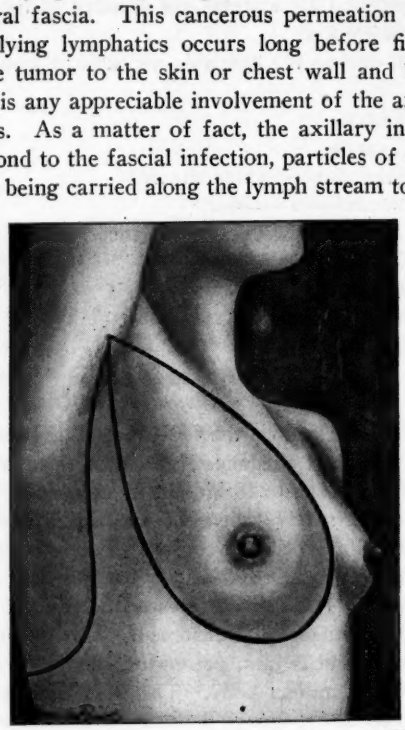


Fig. 1.

Cutaneous incision circumscribing breast and outlining anterior border of posterior flap.

glands. Along the sternal margin of the breast, lymphatics pass through the chest wall in company with the perforating branches of the internal mammary artery. For this reason as well as on account of the increased danger that lymphatic permeation may extend over the epigastric triangle where the fascial lymphatics communicate freely through the linea alba with the subperitoneal lymphatic plexus, cancer developing in the inner hemisphere of the breast warrants an even graver prognosis than does one developing in the outer.

A study of the secondary growths in the skin shows that cancer does not extend primarily along this structure but in the deep fascia and that from the fascia lateral offshoots extend to the skin as cutaneous nodules and into the deeper tissues as bone or muscle metastases. It should not be difficult to appreciate the necessity for wide removal of the skin and the even wider removal of the fascia in operations for cancer of the breast. The use of skin flaps from the anterior chest wall for

closing the operating wound, while very convenient, is not altogether free from danger and for this reason should not be practiced.

Cancerous permeation of the fascial lymphatics extends vertically somewhat more readily than transversely, but it extends in all directions regardless of the direction of the lymph current. For this reason, the area of fascia removed should be roughly circular, the center of the area corresponding to the center of the primary tumor. For practical purposes the distance from the nipple to the clavicle may be taken as the radius of the circle which may be removed without great difficulty by undermining the skin. When the cancer originates in the upper outer quadrant, the fascia should be removed from the clavical above to a line 2 inches

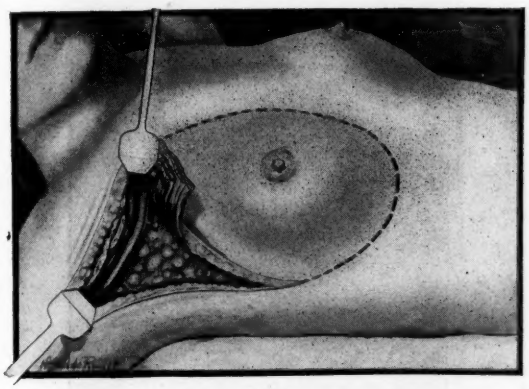


Fig. 2.

Dissection of axilla. Pectoral muscles divided, axillary vessels exposed and branches ligated.

below the level of the ensiform below, and from the middle of the sternum anteriorly to the margin of the latissimus posteriorly. When the growth is located in the inner hemisphere, the fascial dissection should be carried to the opposite border of the sternum and downward on the abdomen for at least 3 inches below the level of the ensiform, especial care being taken in clearing the sheath of the rectus. The extreme care and attention now devoted to the axilla should not be diminished in the slightest degree but the same painstaking thoroughness should be extended to the epigastric dissection.

In planning the subcutaneous incision, it is well to bear in mind the fact that the breast is much more extensive than is ordinarily appreciated and that the surface projection affords little or no indication of the extent of the glandular tissue. As a matter of fact, the peripheral processes extend well beyond the surface projection in all women and to a much greater extent in women who have borne children than in those who have not. The dissection of a number of cadavers to determine the limits of the breast has given the following average results: The breast extends from the middle of the second rib above to the lower border of the sixth rib at the angle where it begins to turn upward toward the sternum. Transversely it extends from slightly within the border of the sternum opposite the fourth rib to the middle of the fifth rib in the midaxillary line. Obliquely, it extends downward and outward from the middle of the third costal cartilage one inch from the sternum to the seventh rib just anterior to the midaxillary line; obliquely downward and inward, from the lower border of the third rib a finger's breadth beyond the anterior axillary fold to the sixth costal cartilage midway between the angle and the sternal end. A well-

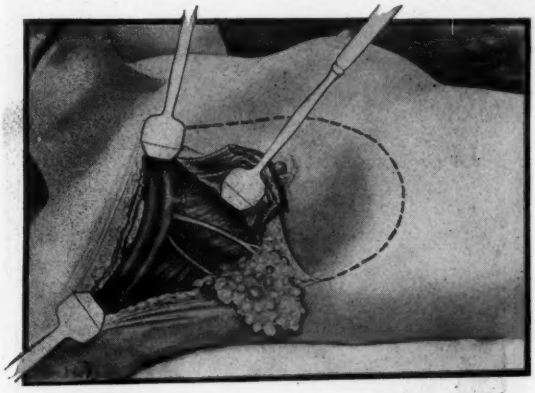


Fig. 3.

The axilla cleared, long thoracic and subscapular nerves exposed.

marked process often curves in under the border of the pectoralis major and extends upward on the serratus magnus to the level of the third rib.

To insure complete removal of the breast with the greatest of mammary skin; free access to the axilla with consequent safe, rapid and easy dissection of the axillary space with a minimum loss of time and blood; and to afford wide exposure and wide dissection of the retromammary structures a modified Tansini technic is followed. The skin incision is in the shape of an ovoid encircling the breast (Fig. 1). The apex of the ovoid is at the summit of the axilla at its junction with the inner surface of the arm, the inner border slightly overlaps the sternum, the base sweeps along the seventh rib while the outer or posterior border passes upward between the anterior and midaxillary lines. The axillary portion of this incision is all that is made at the beginning of the operation, the whole incision being indicated only for the sake of clearness.

The dissection begins at the upper angle of the

incision, the edges of the wound being retracted and the pectoralis major exposed. A finger is insinuated under the border of the muscle and the tendon freed out to its insertion in the humerus. If desired the muscle may be split with the fingers, along the line between the clavicular and the sternal portions, the clavicular portion being left intact while the sternal portion is freed. The isolated tendon is raised up on the finger and divided close to its humeral attachment. The muscle immediately retracts, exposing the deeper structures, principally the pectoralis minor, its fascia, and the costo-coracoid membrane extending upward to the clavicle. The pectoralis minor is isolated in exactly the same manner as the pectoralis major and its tendon divided close to its insertion in the coracoid process. The edges of the wound are now retracted and the axillary space fully exposed. The axillary vein is identified and the fascia covering the axillary vessels is divided along the outer side of the vein and stripped off.

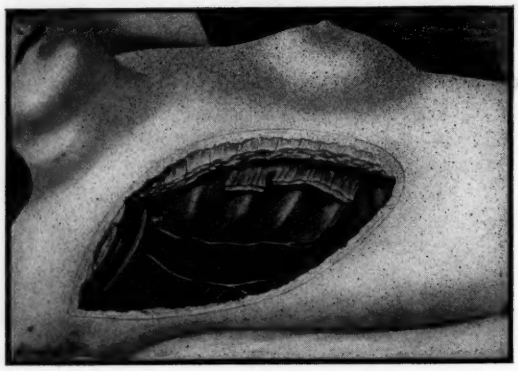


Fig. 4.
Anterior dissection completed. The breast, pectoral muscles, axillary tissue and intervening structures removed in a single mass.

The greater part of this work can be accomplished by wiping the glandular and fatty tissue away from the vessels with pledgets of gauze supplemented by an occasional snip with knife or scissors. In this manner the axillary vessels are stripped and their branches seen and ligated before division. By tying the smaller branches close to the main trunks, the dissection is expedited, as no time is lost by repeatedly cutting and tying the same vessel and its branches, as is the case when the dissection is carried from below upward.

The axillary vessels having been freed from every particle of extraneous tissue, the mass of axillary fatty and glandular tissue is attacked. Outward and downward traction sufficient to put the parts on the stretch is made and the mass rapidly separated from the axillary and thoracic walls by blunt dissection, beginning at the border of the latissimus dorsi, stripping the fat from the subscapular and teres major and working downward and inward till the ribs, the intercostals and the digitations of the serratus magnus are cleared. At latissimus dorsi, stripping the fat from the subscapular and teres major and working downward no point should the fat be cut into, but the whole mass should remain in one piece continuous with the pectoral muscles.

The skin incision is now completed and the surrounding skin undermined and the fascia freed as far as the mid line of the sternum anteriorly and downward over the rectus for at least two inches below the tip of the ensiform. Where there is any difficulty in freeing the epigastric fascia, the skin incision may be prolonged downward. The fascial excision completed, the breast is lifted away from the chest wall and the pectoral muscles divided close to their bony attachments, and the breast, the pectoral muscles and fascias, and the axillary tissues are removed in a single mass.

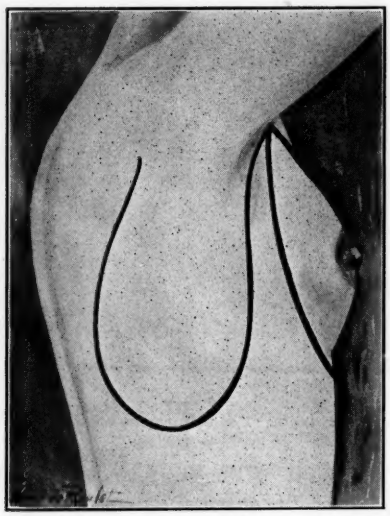


Fig. 5.
Cutaneous incision outlining posterior flap.

As it will often be impossible to close a wound so extensive as this by simple approximation of the edges, it may become necessary to resort to Thiersch's grafts, or, better, the transplantation of a dorsal flap as practiced by Tansini.

After all hemorrhage has been controlled, the mammary wound is protected with sterile gauze pads, the patient turned on her side and the arm elevated and supported by an assistant.

In planning the dorsal flap it is necessary first to locate the posterior axillary line and the spine, axillary border and angle of the scapula, after which the outline of the flap, which should correspond in size and shape with the mammary wound,

is outlined on the skin with iodine. The pedicle of this flap, to insure sufficient blood supply, must be 2½ to 3 inches wide and its center must correspond to a point approximately 1¼ inches posterior to the posterior axillary line and 2 inches below the spine and 4 inches above the angle of the scapula. The long axis of the flap is directed downward and inward toward the median line of the back. The anterior border begins at the apex of the mammary ovoid in the axilla and follows the outline traced on the skin downward and inward, then transversely across the back and finally upward to ter-

Fig. 6.
Dissection of shoulder (posterior) showing muscles involved in formation of posterior flap. Outline of flap indicated by heavy interrupted line.

minate at a point opposite but 2½ to 3 inches posterior to the starting point. This incision divides the skin and subcutaneous tissues and splits the tendon of the latissimus dorsi.

In freeing this flap the operator seizes and everts the lower angle and carries the dissection upward and forward in the cellular layer between the latissimus and the subjacent muscles. In this manner the flap is easily freed up to the angle of the scapula. At this point the infraspinatus and teres major, both of which are included in the flap, are detached from their insertions. In severing these attachments care must be taken not to injure the bloodvessels passing through the pedicle. In freeing the teres major the knife is simply drawn across its insertion along the axillary margin close to the angle of the scapula. The infraspinatus must be stripped from the scapula up to the base of the flap, carrying the edge of the knife as close as possible to the surface of the scapula to avoid injuring the bloodvessels. In making this flap it is absolutely necessary that the skin, subcutaneous tissues and muscles be left in one solid mass and not separated from each other in the slightest degree.

The flap having been completed, it is drawn forward as shown in figure 8 and applied to the chest wall. This implies a slight torsion of the pedicle which fortunately is of no consequence. The flap may be temporarily attached by its anterior and inferior margins to the corresponding margins of the mammary wound with small tacking forceps while the posterior margin is attached in the same manner to the anterior edge of the tongue of tissue left between the two denuded areas. After the flap has been adjusted to the chest wall in a satisfactory manner it is attached permanently with interrupted silk or catgut sutures. The dorsal

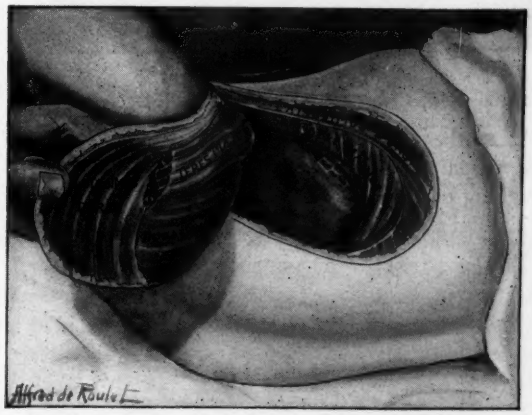


Fig. 7.
Dorsal flap reflected backward to show structure.

wound is closed by simple approximation of the edges. To avoid undue tension it may be advisable to leave a small breech at the lower angle of the dorsal wound to be closed by granulation or skin grafts. Probably drainage is not necessary, but it seems safer to insert a small gutta percha spiral in the angles of the wound for the first 24 hours.

Under ordinary conditions the wound heals within two weeks. By the end of the first week the arm should be extended for at least an hour each day and at the end of the second week active movements should begin. With a little perseverance it is a question of but a few weeks before the arm has regained its normal range of motion, although the strength of the arm is considerably impaired. The action of the latissimus is not appreciably affected by splitting the tendon and displacing a portion of the muscle.

The advantages of this operation are:

(a) The possibility of a complete radical operation in full accord with our present knowledge of the method and route of cancer dissemination.

(b) Restoration of axillary and mammary integument with entirely extramammary flaps.

(c) Satisfactory preservation of normal motion in arm and shoulder.

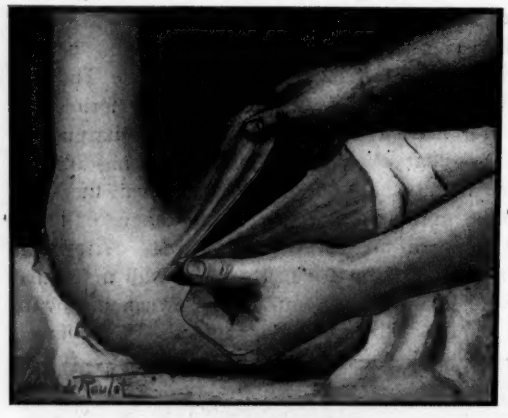


Fig. 8.
Drawing posterior flap into place to cover mammary wound.

As to the disadvantages of the operation, careless preparation of the flap may result in the sloughing of the lower borders. In fact in several of Tansini's earlier operations sloughing to the extent of a third of the flap occurred, but in his later operations, as the result of a more careful study of the blood supply of the flap, sloughing was avoided. In cases reported by D'Este, Purpura, Marzagallia, Campari and Cignozzi this accident does not occur.

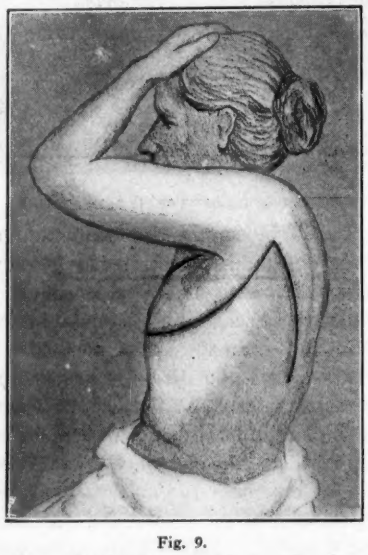


Fig. 9.
From photograph. 6 weeks after operation.

With the technic described and reasonable care in avoiding injury to bloodvessels, prompt union without sloughing may be expected.

1013 Venetian Building.

THE INJECTION TREATMENT OF HEMORRHOIDS.

G. A. HUMPHREYS, M.D.,
Attending Surgeon, St. Bartholomew's Clinic and Hospital; Attending Surgeon, Northwestern Dispensary; Assistant Surgeon, N. Y. Polyclinic Hospital.
NEW YORK.

In 1871 a young physician named Mitchell, of Clinton, Ill., originated this method of treatment of hemorrhoids. He first tried it on an old farmer. We are told that the farmer was delighted with the result.

This young doctor was of an original turn of mind; also he was needy and ambitious. His method was not published. Andrews (Rectal and Anal Surgery, 1889) tells us that a sort of copartnership was formed, the farmer doing the advertising and the doctor treating the cases. Later the secret was sold to quacks and irregular practitioners with rights to practice it in certain districts. It is said that three thousand dollars were paid for such rights in a part of Illinois.

Thus the secret got in the hands of many and in 1876 Dr. Andrews got it from one of these quacks. He corresponded with many of these itinerants and with regular physicians who had observed the practice of these itinerants, and secured about three hundred letters in reply. Through these he collected reports on about thirty-three hundred cases with the following results:

Deaths	13
Embolism of liver	8
Sudden and dangerous prostration	1
Abscess of the liver	1
Dangerous hemorrhage	10
Permament impotence	1
Stricture of rectum	2
Violent pain	83
Carbolic acid poisoning	1
Severe inflammation	10
Sloughing and other accidents	35

FAILED TO CURE.

A number of physicians took up this method of treating hemorrhoids and became over-enthusiastic about it. Kelsey was at first delighted with his results but later modified his conclusions. He says that he did what he could to take this method out of the hands of the quacks and put it on a recognized basis. He used it almost exclusively for about one year and in 1885 published a report of about two hundred cases treated by this method, and was much pleased with it. Later he had a suc-

cession of bad cases that led him to practically abandon it. He says in his work on Rectal Diseases (1902) that this method is still a legitimate way of treating some cases, having in certain points exceptional advantages over all others, but liable to be followed by very disagreeable consequences. Kelsey thinks that, on the whole, suffering after the injection treatment is greater and more prolonged than after ligature or cautery operation. If used at all he recommends weaker rather than stronger solutions.

Gant says in his Text-Book on Rectal Diseases, relative to the results of injection treatment in the hands of quacks: "It can be said to their credit that they made many remarkable cures." He also says that this method is not the method for treatment of piles in general, and in this statement I agree with him. It is his opinion that only small piles which bleed freely and are retained above the grasp of the sphincter muscle should be injected.

Earle, in his Text-Book on Rectal Diseases, says his own experience with the injection of hemorrhoids has not been at all satisfactory, although he has tried most of the improved methods except that of Dr. Collier F. Martin, whom he quotes freely.

Louis J. Hirschman, in his Hand-Book of Diseases of the Rectum, refers to the injection treatment as the method of treatment usually advocated by most of the quacks. After only a few remarks on this subject he says he regards it an unsafe method on account of danger of injecting a blood-vessel and on account of inability to limit the slough of carbolic acid.

Sir Charles Ball says the treatment of piles by submucous injection has been largely practiced in America especially; that various fluids have been used, but carbolic acid in sufficient strength to produce coagulation-necrosis in the interior of the growth is the one which usually is now employed.

Tuttle early emphasized the limitation of the injection treatment to suitable cases of internal piles only. He says that only those piles should be injected which can be brought into view and made surgically clean; and that occasionally small tumors may be treated through the conical fenestrated speculum, but it is not so satisfactory as when they are brought outside of the anus. He does not consider the size of the hemorrhoids a contraindication to this method of treatment so long as they completely collapse when pushed up in the rectum. He does not consider it wise to inject an ulcerating hemorrhoid and thinks this method most applicable to uncomplicated varicose internal hemorrhoids. Commenting on results of this treatment, collected by Andrews, Tuttle says, "The records are not sufficiently complete for analysis but it is safe to say that they show remarkably good results obtained by the method under adverse circumstances; any other surgical operation for hemorrhoids in such inexperienced and unscientific hands would have produced a larger mortality and a longer list of accidents."

W. P. Agnews, of San Francisco, Cal., says (*Proctologist, 4, 1910*) that he has never had a fatality or failure to cure. He has had a long experience with this method and is one of its most ardent supporters.

Collier F. Martin of Philadelphia has treated several hundred cases by this method with nothing but good results and says: "I see no reason, from what I have seen of the results obtained by my father (Dr. Robt. W. Martin) in over four thousand cases, to expect anything but satisfaction from the employment of this method." Dr. Martin and his father have practiced this method since 1876.

In about 1894 I heard the late Wm. T. Bull talking on the treatment of piles; after describing the usual operative procedure for hemorrhoids, he closed his subject by saying in substance that there was another method practiced by quacks or semi-quacks—the injection method. What they used he did not know exactly, but thought the chief constituent was carbolic acid; nor did he know just how, but they did really cure some troublesome cases of piles. He advised great caution in using this method. In short, though admitting cures, his attitude toward it was one of disapproval. I have seen him and likewise many other eminent men quoted as disapproving of the injection treatment on the ground that it was unsurgical, but the impression I got from Dr. Bull's lecture on this subject was that he had never even tried it up to that time.

Early in the nineties in a town of about ten thousand population I heard of a man who, in the early eighties, came to that town just graduated in medicine. He had soon become known as one who treated piles without the knife, and he rapidly acquired the largest practice in and about this town. Those who told me of his career were, many of them, his patients who had, after suffering for years from piles, using palliative remedies and occasionally refusing operation, submitted to the injection treatment. They represented cures of several years' standing and I did not hear of any unfortunate results at his hands, either from his patients or from the other physicians in this town.

In about the year 1900, in the office of a life insurance company, I knew personally a clerk who

had for years suffered from piles; they protruded, bled freely and at times became so inflamed that he had to absent himself from his desk for many days at a time. I treated him as had many other physicians. I advised operation, which he refused to submit to. Like many others, he finally found the address of an advertising specialist, who treated piles without the knife. In three or four weeks this man was, according to his own statement, cured. At all events he was not detained from business during several years after this treatment, during which time I was able to follow him.

Among those who have used this method of treating hemorrhoids, we find quite conflicting opinions. It is very evident, however, that those who have used it most are its most ardent advocates. It does seem that results could not have been so different in the hands of different men had they used the same solution on the same kind of cases.

The fact that this method is condemned by so many men does not seem to discourage the patients, but rather only the physicians. The contributions to the literature on this subject have been fewer in the last ten years than in the ten years preceding. The news has gone broadcast, however, that piles can be cured without the knife and many of these patients are looking for such a cure. The family physician fearing the injection treatment because of what he has read of its dangers, advises operations and refers his patients to the surgeon who very regularly advises operation and stands out for this as the only cure or the only safe method of treatment. Some patients submit and have certainly not acted unwisely by so doing, but I think a larger number refuse the operation and either go untreated or find their way to the hands of the advertising specialist who will treat without operation, i. e., by electricity or the injection method.

The result is that a large percentage of rectal work, as well as public confidence, is being lost by the regular profession, in the family physician and consulting surgeon when they continue to advise against a method of treatment, as unscientific and unsafe, which is very regularly in the hands of others proving curative and attended by little or no danger.

I would suggest that our leaders in this department of surgery either demonstrate in a more convincing manner the dangers, the unreliability, serious complications, mortality and lack of permanent result from this treatment, or instruct the student and practitioner so that he is able to not only operate on suitable cases but also to treat by the injection method or other form of legitimate treatment and produce results as satisfactory to the surgeon and patient as are being produced by the few regular physicians and many advertising specialists.

With such discordant opinions I did not know whose advice to follow. Some used weak solutions; some used strong solutions. Some writers became too enthusiastic—using the injection treatment to the exclusion of all others, while other writers mention this method of treatment only to condemn it. Yet I felt that there was something of value in the injection treatment and about fourteen years ago began to use it, since which time I have employed it in about four hundred and fifty cases. My attempt has been to produce harmony out of so much discord—at least to clear up the matter in my own mind.

In 1898 I made my first injection in a case of well-developed piles. I treated the largest pile—injecting ten minims of a 50% solution of carbolic acid in olive oil. Before the needle was withdrawn, the patient developed an intense pain in the frontal region. He jumped off the table with his hands to his forehead, complaining of vertigo with intense pain in the frontal region; after a few minutes this subsided. There was no paralysis, no area of anesthesia or hyperesthesia. After about forty-five minutes he was able to go home.

There was some necrosis of the injected pile, a healthy granulating surface that healed nicely and left the patient cured. The smaller piles did not come down after the largest was removed. Later examination showed complete disappearance of these. My interest in the injection treatment was lost for the time.

During the next few years, however, the patients that refused operation and additional cases that had been relieved by the injection treatment that came to my notice, led me to believe that I had employed faulty technic and perhaps an imperfect and too strong a solution; so again I began injecting some cases of hemorrhoids.

This time I decided not to use such a strong solution, not to attempt to get a cure by producing superficial necrosis, slough and ulcerating surface, but to attempt to produce an inflammation which would result in production of connective tissue and gradual obliteration of the bloodvessels of the pile without causing any break in the continuity of the mucous membrane covering the pile. I also endeavored to be more sure that my solution was a perfect one—not knowing whether my unpleasant result was due to a small globule of oil or of undissolved carbolic acid or to a small particle of fibrin or albu-

minous material precipitated from the blood by the strong acid. I also attempted to develop a technic of operation so as not to allow injected material to get into the blood current. Accordingly, this time I began using the following modification of Shuford's solution, pronounced the most satisfactory by Tuttle:

Acid carbolic.....Dram. 2
Acid salicylic .....Dram. ½
Sodium biborat. .....Dram. 1
Glycerine (sterile) ...ad. oz. 1
M. et Sig. 25% carbolic solution.

Using eight to ten minims of this solution in one pile at one sitting, about one-half of my cases resulted satisfactorily; in the other half there was some necrosis—a few days after injection the mucous membrane over the center of the pile would become dark or black and later there would be some necrosis. I found that I must reduce the amount injected to five or six minims and inject towards the centers of the pile in order to produce the desired effect—inflammation without any superficial sloughing. In fact, I soon realized that I was dealing with a solution that was capable of doing too much damage, so I again reduced the strength, this time using:

Acid carbolic .....Dram. 1
Glycerine ..... q. s.
Aquae .....ad. Dram. 10
M. et S: 10% carbolic acid solution.

The glycerine is added drop by drop after the acid and water are mixed—the mixture being stirred until solution is perfect. The glycerin is added only as a solvent for carbolic acid—carbolic acid being soluble in water about one part in twenty. Incidentally a small quantity of the carbolic acid is converted into glyceride of phenol—practically one part of carbolic acid uniting with four or five parts of glycerin. Since, however, the quantity of glycerin necessary to produce a perfect solution in the above formula is only fifteen to twenty drops, only four or five drops of carbolic acid has united chemically; so we still have practically a ten per cent. solution of carbolic acid.

I later reduced the carbolic acid to five per cent. and lower, but found that the inflammation produced was not of a sufficiently obliterating nature—the parts injected would swell but disappearance of swelling would not leave sufficient induration, and in a short time many cases would require repeated injections. I accordingly went back to a stronger solution—the ten per cent. phenol solution—which I have used entirely now for the past few years—once in a while, however, using an eight and one-third per cent. solution.

It is interesting here to recall that many writers have advised that if this method is to be used it is better to use weaker rather than stronger solutions, but just what strength of acid they do not advise. It is also interesting to note the strength of carbolic acid in some of the secret remedies that had quite a run.

Brinkerhof's secret remedy:

Acid carbolic ..... Oz. 1
Zinc chloride ..... Gr. 8
Olive oil ..... Oz. 5
M et Sig: Carbolic acid 16 2-3%.

"Rorick System":

Acid carbolic .....Dram 1
Glycerine .....Dram 2
Ext. Ergot. fld. .....Dram 1
Aqua .....Dram 2
M. et Sig: Acid carbolic 16 2-3%.

Thus we are able to notice a tendency of these secret remedies to work toward a weaker solution—although some of them, such as "Gram's Painless Injection," contained about fifty per cent. carbolic acid.

AUTHOR'S METHOD.

My method—

Preparation of the patient.

The patient is given a cathartic the night before the piles are to be injected; after the bowels have moved well the following day he reports for treatment. This is usually in the afternoon when we are certain the cathartic has finished its work. The patient is then allowed to sit on the commode and by straining bring down the pile or piles, or if unable to do so a small injection of soapsuds or an injection of a few ounces of water containing a half ounce of glycerine is given, when the piles will usually descend and the patient is placed on the table. It is often unnecessary to give the enema or use the commode, as the patient lying on the side is able to drive down the pile when assisted by the fingers of the operator, slowly tearing open and pulling down on the edge of the anal mucous membrane.

It is easier to inject the pile on the lower side so if the patient has piles on only one side he is instructed to lie on that side with his buttocks well out over the edge of the table and the knees drawn up to the abdomen. If the pile shows a tendency to recede, the patient is instructed to bear down gently.

THE OPERATION.

One of the most important elements in the successful administration of this treatment is the syringe. The hypodermatic syringe with a barrel

of smallest diameter which works smoothly is all that is needed. If the diameter of the barrel is large as in the antitoxin syringe, the smallest advance of piston means too much solution deposited in one place; also, if the syringe works in a jerky manner, too much may be deposited in one place.

The syringe with bent shank devised by Gant is very good for the purpose, but the plain syringe above described is all that I have ever found necessary.

The needle and syringe are first boiled and then ten minims of the ten per cent. solution of carbolic acid, prepared as above described, is drawn into it and the air is expelled. Then with the thumb of the right hand covered with dry gauze applied near the edge of the pile, the latter is prevented from returning by pulling away from the edge of the anus—not allowing the thumb to slip over the skin. At the same time the index finger of the left hand, thoroughly lubricated with sterile vaseline or other sterile lubricant is introduced with the ball of the finger pressing upward so as to avoid pressure against the pile that is to be injected while this finger is being introduced. After the introduction, the finger is turned with the ulnar side toward the pile, and bent; and with pressure thus applied, using the finger as a tractor, a pile of any size can usually be held in position for treatment. The nurse then takes hold of the skin near the edge of the pile with dry gauze and pulling down unfolds the pile, so to speak, thus opening up the depression between the external and internal portion of the protruding pile so that it may be thoroughly cleansed. With the right hand of the operator thus free, the parts may be thoroughly cleansed and the tumor injected. I usually use a weak solution of carbolic acid (1-40) for cleansing and then, before injecting, touch the point where the needle is to be inserted with a little pure carbolic acid on the point of a probe and stop its action on the tissues by allowing a little sterile water to run over it immediately, or I touch this point with a little tincture of iodine on the point of probe, not using enough to spread. Then the needle is inserted. The point chosen for the insertion of the needle should be in the wall of a crypt of Morgagni or in a column of Morgagni, which is the lowest portion of the internal pile above the internal sphincter when the pile is replaced. If the point of introduction of the needle is in an external pile or in the anal mucosa below the internal sphincter, there will be more swelling of the portion below the grasp of the internal sphincter and more tenesmus after the operation.

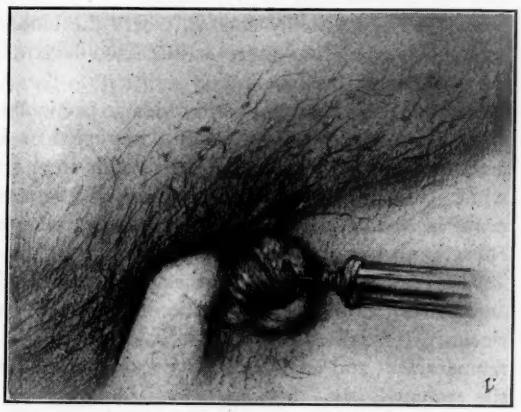
The accompanying plate shows a pile being injected. It shows the position of the finger holding the pile and also the point where the needle should enter.

After introduction, the point of the needle is carried upward beneath the pile to its upper limit where the needle can be felt by the finger beneath the mucous membrane and where it moves freely from side to side; here two or three drops of the solution are deposited. Then the needle is partly withdrawn and directed into the body of the pile where two or three drops are deposited; the position of the needle point is again changed in the substance of the pile and two or three drops are again deposited, and so on until the ten minims are used.

Depositing a few drops under the normal mucous membrane at the upper limit of the pile helps to prevent prolapse of the injected pile as its result is a small elongated mass of indurated tissue fairly holding the mucous membrane in position. After injection the needle is left in position a few minutes, as this procedure seems to seal the opening so there is less apt to be any bleeding. The finger that is used as a tractor should remain in position about five minutes after injection is completed, keeping pressure against the wall of gut above the hemorrhoid and pulling downward, thus thoroughly obstructing the return circulation of the pile. The circulation of the superior hemorrhoidal veins which collect blood from the rectum and return it through the portal circulation should be controlled by lateral pressure mainly as they run upward in the wall of the gut. The circulation of the middle hemorrhoidal veins which collect blood from the anterior surface of the rectum and return it through the hypogastric, internal iliac or prostatic veins to the general circulation, and the circulation of the inferior hemorrhoidal veins, which collect blood from the lower surface of the levator ani muscle and from the external and internal sphincters and return it through the internal pudic veins to the general circulation, should be best controlled by downward traction and lateral pressure, since these veins leave the wall of the gut at a decided angle and lateral pressure cannot be very effective until the pile is drawn down and the veins compressed between the finger and the sphincter muscle. It is to my mind important that such occlusion of superior, middle and inferior hemorrhoidal veins be carried out as perfectly as possible as they all enter into the formation of the hemorrhoidal plexus where some part of the injected material may be deposited.

When it is not possible to bring the pile to be injected outside and get the finger above it, it may be

managed by introducing the blade of Sims' speculum or, better still, my modification of Sims' speculum for rectal work, with the concave surface toward the pile to be injected, and then placing a stiff probe bent U-shaped over the pile and with this exert lateral pressure and downward pull; or with fenestrated speculum, when the pile is in the fenestra, with this speculum alone lateral pressure and downward pull may be exerted. In any of these ways when the pile is secured and injected as above, I regularly hold it so for about five minutes—until the injected material has had time to thoroughly coagulate the blood with which it has come in contact and the pile becomes striated and somewhat hardened by effusion.



Shows the method of injecting a hemorrhoid—finger in position and point of entrance of needle either in a crypt or column of Morgagni.

Sometimes blood will spurt freely from the puncture, but this can easily be controlled by pressure with a piece of gauze. Slight bleeding, however, very regularly stops when the pile is returned, as the blood pressure in the pile is thus lessened.

After the pile is replaced a small roll of gauze is placed over the anus and pressed upward; the buttocks are then strapped tightly together—the object being to prevent the pile being protruded. In some cases where the hemorrhoids are large and show a marked tendency to prolapse, when replaced after injection, I have found it necessary to introduce a drainage tube of soft rubber ½ to ⅝ inches in diameter and wrap some gauze around the outer end of the tube through which a large safety-pin has been passed, and hold this in position with adhesive straps across the buttocks. (This tube may be removed in twenty-four hours.) The patient is then kept quiet for about fifteen minutes, after which time he may go home. He is instructed to remain recumbent during the remainder of the afternoon and evening, and to take a light diet for that day and the day following, as our purpose is to prevent movement for two days. If the bowels are loose they may be controlled by giving deodorized tincture of opium, 10 to 15 minims, three times a day. The patient is also told that should the pile come down it must be returned, and if he cannot replace it and keep it up by lying down, he must report immediately.

The patient can go about his business the day after treatment unless the pile shows a marked tendency to prolapse.

Before the time for evacuating the bowels the patient is instructed to take a 6-ounce enema of olive oil or of normal saline solution, to secure a movement with as little straining as possible. After this first movement is secured without prolapse of the treated pile there is little likelihood of its coming down again, unless it has been insufficiently treated, in which event, after inflammatory induration subsides, it may come down again in whole or part. If so, it is injected again, and still again, if need be, until connective tissue is formed in sufficient quantity in, above and beneath the pile not only to cause gradual atrophy (due to obliteration of bloodvessels) but to hold the remaining pile tissue above the sphincter.

If after one injection the pile does not come down, then in five to seven days a second pile is similarly treated; after another five or seven days another pile is attacked, or any one that has been previously treated is again treated if it does not stay up, or if bleeding continues from it—and so on until the case is cured.

A case may require only one or two injections or as many as ten.

It is very important to keep the bowels in good condition during treatment, care being taken not to produce diarrhea, which is as unfavorable as constipation.

Hemorrhoids should never be injected:

When strangulated.

When highly inflamed.

When of the thrombotic type.

When a painful fissure coexists.

When external (belonging outside the sphincter).

When combined external and internal, if it is impossible to replace and retain the internal portion above the sphincter.

Many authors advise against injecting ulcerated hemorrhoids. I have seen but few that were too badly ulcerated for the injection treatment, provided there was no strangulation and no thrombus and, of course, no malignancy. In fact a large

percentage of my cases were of the type that bled regularly at stool from superficial ulcerated surfaces.

Also there are those who advise against injecting a hemorrhoid because it is large and hypertrophied, but I find this no contraindication so long as the mass can be returned and retained above the sphincter. If the hemorrhoid is of the mixed variety, inject only the internal portion.

After injection the patient is regularly told that there may be some slight discomfort or even pain, but the rule is that there is none. If anything more than a sensation of fulness is present, it usually means that the tumor has slipped outside the sphincter, or that there has been too much solution injected for the size of the pile, producing a degree of inflammation closely approaching abscess formation.

A digital examination the next day after an injection shows the pile hardened and elongated in the long axis of the bowel (not transversely), and above the pile, extending for two or more inches, will be felt an elongated swelling under the mucous membrane about the size of a lead pencil. This swelling invariably extends up and down the rectum and not transversely, thus following the direction of the blood and lymphatic vessels in the mucous membrane. This induration disappears only gradually and it may be several weeks disappearing entirely.

With the exception of my first case, my troubles have been with those cases of external and internal hemorrhoids—the mixed variety—where piles were very large and three or four in number and had remained outside so long that the sphincter had lost all tone. It was difficult to keep these up after injection, and if they got down after injection they would become strangulated and of course very painful and in some cases even require operation. In such cases I prefer the clamp and cautery operation, but if we can succeed in retaining these above the sphincter after injection, such cases can be cured by this method. Since using adhesive straps, as above mentioned, I have had little trouble with these tumors prolapsing.

I have found a good sphincter to be a decided aid in the treatment of hemorrhoids by the injection method and I cannot understand why some writers of large experience recommend that the sphincter be previously stretched under gas. This I cannot agree with (unless a fissure is present), for it impairs the support I want. Strong action of the sphincter does no harm and causes no pain if the point of puncture is above the internal sphincter and if the injected pile is replaced above the internal sphincter and kept there. Strong action of the sphincter does do harm and cause pain if there be an ulcer in the anal canal or if the internal pile descends and is grasped by the sphincter. If, however, the sphincter is dilated enough to weaken its action four or five days later, when one well-known operator begins his injections, then I fear it amounts to a divulsion with some tearing of the fibers of the sphincter muscle. Moreover, if the patient is willing to take even gas, I would prefer to operate with the clamp and cautery and would treat less frequently with injections.

There are some cases, however, particularly suitable for this method of treatment:

First—The markedly anemic, where the blood is so impoverished that there is increased hazard in the operative procedure.

Second—The tuberculous subjects, particularly when the patient has pulmonary, laryngeal or intestinal tuberculosis or tuberculous fistula in ano, in which cases the tubercle bacilli would frequently come in contact with the raw surfaces following operation.

Third—Where disease of other organs makes the administration of an anesthetic inadvisable, particularly if such subjects are of a highly nervous temperament and unsuitable for cocaine work about the rectum.

Fourth—The bleeders. I have had no case of hemophilia bleeding from piles, but would certainly try the injection method to control bleeding in such cases.

For purpose of illustration I cite a few cases:

I. A woman who recently came into one of my clinics. She had given birth to a child two weeks before I saw her, having been troubled with bleeding piles during the latter part of pregnancy. She was attended by a midwife and lost considerable blood during and following confinement; then after uterine flowing was checked she continued to lose blood from her piles. She was markedly anemic and could not walk across the floor without very noticeable dyspnea and palpitation of the heart. She was treated by the injection method; bleeding from the piles stopped and she improved immediately. I would not have favored operation on this patient unless it was unavoidable.

II. The case of a man I saw recently emphasizes the importance of not making raw surfaces about the rectum and anus in a tuberculous subject. This patient had been gradually losing flesh. He had piles and these were operated on; his general condition was not improved. He fell into the hands of another surgeon who removed some remaining piles. Shortly afterward the ulcerating surfaces broke down, the edges became undermined, the patient developed a profuse diarrhea, and an irregular fever. Some ulcers were detected in the sigmoid through the proctoscope. Some tenderness devel-

oped over the abdomen and the patient was losing flesh and strength very rapidly. The abdomen was opened. Parts of the colon were found much thickened and inflamed and the seat of a fair number of miliary tubercles.

The possibility of inoculating through abrasions and wounds with tubercle bacilli has been demonstrated.

In the case above cited the granulating surfaces in the anal canal and rectum, which for some time appeared healthy, became tuberculous and after this tuberculous ulceration in the rectum and anal canal had progressed for about two weeks, there was a further dissemination of the tubercle bacilli; whether it came from the rectal ulceration or from the original focus we are unable to say.

At all events it is taking unnecessary chances to operate for piles on any patient whose feces probably carry tubercle bacilli and there are many such patients. I have been much surprised to see how many patients among the poor in my recital clinics are being treated at the different clinics in New York City for tuberculosis, and many of these without the general appearance that suggests tuberculosis. I have usually been able to successfully treat the hemorrhoids of such patients by the injection method.

RECURRENCE.

I have not had over five per cent. of recurrence when the patient would remain under treatment and observation until pronounced cured. Some, however, that were pronounced cured I was unable to trace after a few months and it is more than likely that some of those recurred. There are frequent recurrences when the patient after one or two injections thinks he is cured and remains away.

One class of cases I would mention here as not being particularly suitable for the injection treatment because of much greater liability to recurrence after injection than after free removal with a resulting cicatrix, is the female with deeply torn perineum and marked rectocele.

COMPARATIVE VALUE OF THE INJECTION TREATMENT.

Ordinarily I prefer and advise the clamp and cautery or ligature operation because the treatment is shorter and because results cannot be improved on when these operations are properly done and because we seldom have a recurrence.

The ligature operation as a rule causes much post-operative pain. The injection treatment causes little or no pain; and if the external pile does not disappear on replacing the internal, there is apt to remain even after a cure by this method a ragged edge at the anal orifice. This is composed of decidedly fibrous skin tags which may prevent the patient from cleansing himself as well as he might without them, but I have never had a patient complain of them. These could easily be trimmed off with scissors and when cut off they bleed but slightly because of their fibrous nature.

The injection treatment is, in my opinion, a far safer treatment than the Whitehead operation. I have never seen a stricture of fistula or partial incontinence follow the injection treatment. Some bad result of the Whitehead operation—particularly stricture or partial incontinence—I have often seen.

I would roughly estimate that about fifty per cent. of the cases I see could be safely treated and cured by the injection treatment. I prefer the clamp and cautery operation if the patient is not opposed to operation and if there is no contraindication, because results cannot be better, and the treatment is shorter.

I regard the injection method practically free from danger when not over ten minims of a ten per cent. solution are used, properly distributed, at one sitting. Using this weak solution in this quantity I have had no superficial necrosis and no abscesses. I would not use a strong solution attempting to get rid of the pile by sloughing in any case. One cannot limit the slough to the pile, whereas with the scissors the destruction can be limited.

So far as concerns infection, there is less possibility of this if a sterile solution is injected with parts thoroughly cleansed, provided we have no necrosis and break in the mucous membrane, than where we have the open wound as with operation.

Then again thrombosis has been used as an unnecessary danger, but the one offering such criticism does not stop to think that coagulated blood plugs all the arteries and veins cut during an operation, and that one end of these is exposed after a hemorrhoid operation where it is difficult to keep the wound clean while the other extends a variable distance into the vessel and remains so until it becomes organized. The dangers from a thrombosis are practically nil unless there be infection.

I employ the injection method in the classes of cases mentioned above and in other suitable cases where operative treatment is objected to by the patient. We should not tie ourselves to one method. Every one who operates on piles should be capable of employing the injection treatment. It certainly has a wide field of usefulness.

Do not apply a dressing that will cause pain or discomfort in an ulcer. The patient removes the dressing and consults another surgeon.—*Bernays' Golden Rules of Surgery.*

CELIOTOMY IN INFANCY AND EARLY CHILDHOOD.

Q. W. HUNTER, M.D.,
LOUISVILLE, KY.

It has hitherto been the almost invariable custom of medical writers to erroneously employ the term laparotomy (instead of the correct designation celiotomy) to represent incision of the abdominal parieties in any situation, and the writer wishes to plead guilty to numerous such errors of expression.

It has apparently been overlooked that laparotomy literally signifies surgical opening of the abdominal cavity through the flank, i. e., "cutting the loin," whereas celiotomy represents surgical incision of the abdominal parieties elsewhere, i. e., "cutting the belly." Therefore, unless the abdomen be incised through the flank, the term laparotomy is not only inexpressive but must necessarily be distinctly incorrect. However, the two designations (laparotomy and celiotomy) have so long been considered synonymous and interchangeable that common usage (by those presumably in position to intelligently and authoritatively discuss questions of surgical import) has rendered their utilization thus permissible. And, in passing, it may be interesting to note that numerous other not dissimilar errors of expression occur in the nomenclature of operative surgery and also in various collateral branches of medico-chirurgical science.

The writer offers no apology for the foregoing semi-critical preamble which bears no intimate relationship to the superscription or intended subject-matter of this dissertation, the principal object of the criticism being to direct attention to an erroneous expression knowingly or otherwise perpetuated by the majority of authors, editors, et al, and to incidentally plead equally guilty!

From time immemorial it has been the almost universal impression that infants and young children constitute exceedingly unsatisfactory and unfavorable surgical subjects; indeed, it has been so frequently reiterated that surgery is badly borne by the young that the truth of the axiom—"surgical intervention in infancy is invariably fraught with infinitely greater immediate and remote dangers than in the adult"—is seldom questioned. It has hitherto been especially emphasized that celiotomy in the young is much less encouraging, both as to immediate and subsequent results, than in adults. Lack of appreciation that the patient is an infant, consequently that certain changes and modifications in management and treatment are essential to insure results approximating those to be reasonably expected from similar operative procedures upon adults, is probably responsible for a large percentage of the unsuccessful surgical operations performed upon young subjects. Even so eminent a surgeon as Manley declares: "It is well known to experienced surgeons that children bear the shock (e. g., of amputation) and loss of blood very badly; true, ether anesthesia stimulates the vital forces for the ordeal and paralyzes the sensory reflexes; but, notwithstanding this, in not a few cases reaction fails to become established, and mortal collapse follows." On the other hand Alexandrow claims that even major surgery can be successfully performed upon infants, and after denying the truth of the universal opinion regarding special danger in such cases, suggests that the greatest danger lies in hemorrhage, that the loss of two ounces of blood may place a young child in grave peril, whereas four ounces may prove fatal.

The surgeon who undertakes operative procedures upon infants and young children should not overlook nor ignore the following fundamental propositions:

1. That while the child may take the anesthetic well for a short period, if the administration be unduly prolonged serious collapse is more common than in adults; hence, there should never be permitted the slightest delay in completing any operative steps which may be undertaken, i. e., the operation should be terminated in the shortest time possible consistent with perfect technic and the observance of adequate aseptic precautionary measures.

2. That the child ordinarily withstands the loss of blood badly; hence, every possible precaution should be exercised to prevent and control hemorrhage, and means should be readily accessible with which to replace such loss, if it becomes advisable or necessary, by transfusion or introduction of normal saline solution.

3. That the child endures cold badly; hence, the extremities should always be amply protected, and if necessary be kept warm by artifical means; care should always be observed that the body be not unnecessarily exposed, and the operation should be performed with the child on a warm-water bed, or at least in a properly heated room.

4. That the child bears hunger badly; hence, nourishment should not be inadequate before the operation, nor should this feature be neglected thereafter, i. e., requisite feeding must be resumed so soon as permissible after completion of the operation.

At the same time the pertinent facts must not be

permitted to pass unobserved that (*a*) the nervous system of the child, being imperfectly organized and immaturely developed, it is reasonable to assume that the systemic disturbances consequent upon administration of the anesthetic and the operative manipulations will be less marked than those which occur in the adult under similar circumstances, that (*b*) the recuperative and reparative processes of the child are relatively more prompt, and consequently normal equilibrium should be more speedily restored than in the adult.

The foregoing suggestions are in practical accord with the views of Alexandrow who remarks that (*a*) in case of great loss of blood during the operation, subcutaneous introduction of saline solutions is recommended; (*b*) small (i. e., young) children stand anesthesia very well, in many respects better than adults; (*c*) generally children recover quickly after anesthesia, and are sometimes ready to take their meals within two hours; (*d*) recovery after operation is as rapid in children as in adults, even toward infected wounds the infantile organism shows wonderful power of resistance. Comte likewise does not regard childhood a contraindication to celiotomy, but as collapse develops quickly advises prompt action.

With especial reference to the administration of anesthetics in children Erdmann claims that (*a*) few children die under anesthesia; (*b*) as a rule a child bears the anesthetic better than an adult; (*c*) care should be observed to conserve the body heat and obviate the loss of a large amount of blood, and (*d*) to shorten the period of anesthesia as much as possible.

"The preparation of infants for operation and their subsequent treatment requires special knowledge and attention, as they will not stand the usual starvation, purgation and sterilization before operation, and are likely to develop digestive disturbances, bronchial irritations, pulmonary, urinary and other complications after the ordeal is over. After the operation pain should be relieved if necessary by the use of an opiate, perferable paregoric. Feeding should be promptly instituted and judiciously continued. Dressings should be frequently inspected and changed when soiled by urine or feces. As a rule no effort should be made to keep the child in bed, but from the first it should be permitted to be on its mother's lap or carried about in her arms. With reference to the operation itself, there are some special features which should be considered. The anesthetic should not be commenced until every preparation is complete and the surgeon is ready to begin. Enough should be given, but no more. Chloroform in my experience (McGuire) is safer and more satisfactory than ether. It should be discontinued before the last stitch is tied. The instruments should be small. (Lilliputian—Crile.) Anyone who has done a posterior gastroenterostomy on a three weeks-old infant will recognize that a surgeon should have a 'special kit of tools' for work on these little patients. The danger of shock should be constantly in the surgeon's mind, for while in infants less than three months old, on account of the rudimentary nervous system, shock is not as as a rule so dangerous as in older children (Brophy), it should be minimized by handling tissues gently and avoiding loss of blood, loss of heat and loss of time" (McGuire).

Rachford remarks that in so far as the lungs, the heart, the muscles, the bones and the glands are concerned, Dryden was right when he said "men are but children of a larger growth"; but in so far as their nervous and reproductive systems are concerned, he was wrong. The most important fact, and the one which should be the most strongly impressed upon the mind, is that at birth the nervous system of the infant has comparatively a very low degree of functional and structural development. Compared with the respiratory, circulatory and excretory organs, the nervous system not only has a poor start, but in the race for development lags far behind. A peculiar fact in this connection is that in size and weight the nervous system develops more rapidly than does either of the other systems, but in its functional development it is also far behind. (Rachford.)

According to a brief paragraph appearing in the AMERICAN JOURNAL OF SURGERY, New York, celiotomy was performed upon an infant one day old for the purpose of arresting internal hemorrhage due to rupture of the umbilical artery, and that, too, without the administration of an anesthetic; yet the infant is said to have pursued the even course of life, as well in fact as if nothing unusual had occurred. If this report be reliable, it undoubtedly represents the youngest patient upon whom a successful celiotomy was ever performed.

A California surgeon operated upon an infant of two months for congenital hernia, and the appendix vermiformis being found to occupy the hernial sac was also extirpated. A duplicate of this example is recorded by Sherrill, of Louisville, except the appendix was not contained in the hernial sac; and Kidd performed a similar operation upon a child of three months.*

*In this connection the writer is reminded of a rather remarkable example reported by Owen, the patient being a female infant who developed intussusception on the day of its birth and who came un-

More recently Moule operated upon an infant sixteen days old for strangulated hernia, which so far as the writer is aware represents the youngest instance of the kind on record. Sixteen days after birth the infant was suddenly seized with an attack of vomiting and seemed seriously ill; but shortly became better and passed feces and urine. An hour thereafter a lump was discovered in the right scrotum which "gurgled" on pressure but was irreducible even under chloroform. The sac when opened proved to be a patent funicular process containing about four inches of purplish intestine.

As early as 1883 Chiene, of Edinburgh, performed successful oophorectomy upon a child aged three months. An inguinal swelling suddenly appeared, and after various local measures had been faithfully tried without affording relief, the infant was subjected to celiotomy. The contents of the supposed cyst were found to be the ovary and fallopian tube.

Campbell removed by celiotomy a cystic abdominal tumor weighing three pounds from an infant of seven months. The cyst contained ten ounces of clear yellow fluid with a solid portion in which were embedded pieces of cartilage and bone. There was nothing to indicate the organ or structure from which the tumor originated. "This appears," says the author, "to be the youngest child from which a cystic abdominal tumor has been successfully removed, the only example which approaches it in point of youth being one operated upon by Roehmer, of Berlin, at the age of twenty months." Weil performed salpingo-oophorectomy upon a child of five years removing a freely movable left ovarian tumor the size of a large cocoanut. The right ovary was small and apparently normal.

Judkins records the case of a recurrent vesical calculus in a boy of seven years. At the first operation a stone weighing over ninety grains was removed by suprapubic cystotomy. Five months thereafter the child again complained of symptoms pointing to vesical calculus, and seven months after the first operation median lithotomy was performed and a second stone weighing eighty-five grains was removed. No facets were observed upon either calculus. A feature of peculiar interest is the rapidity with which the second stone formed.

Celiotomy was performed by Johnson upon a girl of five because of violent abdominal pain, vomiting and diarrhea. He discovered and extirpated an ovarian tumor, the pedicle of which was twisted twice around its axis.

Ruggi mentions having performed several abdominal sections upon a boy of eight for relief of intestinal obstruction originating from external violence (traumatism), and during the last operation removed three portions of the small intestine, aggregating over ten and a half feet in length, the lower incision being six inches from the ileacecal valve.

Roehmer (v. s.) successfully performed oophorectomy upon a child one year and eight months old; Alcock, on a child of three years; Schwartz and Barker, on children of four; Thornton, on a child of seven; Wells, Cupples and Chenoweth, on children of eight; Rein removed a multilocular cyst of the left ovary from a child of six, and contrary to the generally accepted opinion, expressed the belief that "childhood and infancy were favorable to celiotomy." Kidd removed a dermoid (ovarian) cyst from a child of two years and eleven months; Hooks performed a similar operation on a child of thirty months; Meigs duplicated the operation on a child of ten years; Chiene (v. s.) extirpated an ovarian tumor from a child of three months, and Neville is said to have later duplicated the operation on a child one month younger.*

Carpenter collected from the literature thirty-five examples of oophorectomy (including some of those cited in the foregoing) in patients of twelve years and under. Of these fifteen were dermoids, ten cystic, nine malignant, one fibromyoma. In one case of cystic disease both ovaries were implicated, and in another both ovaries were sarcomatous. There were six deaths, and in another the disease (malignant) recurred two years later with fatal result. The author (Carpenter) once discovered the left ovary enlarged in a child of three and a half years; there was sarcomatous infiltration of both kidneys, also abdominal deposits among other areas of attachment. Rosenstein reports an example of carcinoma in a child of two years, and Ganghofner observed a carcinoma of the uterus in a child of eight.

While typhoid fever is comparatively infrequent in children under the age of five years, yet the literature contains records of a few such examples in which intestinal perforation occurred during the

ler observation the following day, at which time an enema was given with negative result. On the succeeding day the enema was repeated, but being also without effect a celiotomy was performed (at the age of three days), and an artificial anus established without searching for the invagination. The infant died when nine days old. The next youngest case of this kind was observed by Hirst, infant two days old, which also died.

*In the examples thus far cited in the body of this paper, some of which are abstracted from the admirable work of Gould & Pyle on the "Anomalies and Curiosities of Medicine," celiotomy was said to have been entirely successful, i. e., the immediate and subsequent mortality was nil; and the excerpts are interpolated merely for the purpose of emphasizing the suggestion that even in the hands of certain of the older surgeons infants and young children were not invariably unfavorable and unsatisfactory surgical subjects.

second or third week, as indicated by a chill, pain, rigidity, vomiting, fall of temperature, increase of pulse rate and collapse. Under such circumstances if prompt celiotomy be performed with proper closure of the perforations, the mortality should be less than 50 per cent. (Jopson, Gittings, et al.) Of course where perforation of the intestine occurs, the earlier the operation is undertaken the more favorable is the prognosis.

Contrary to the views entertained by numerous observers, appendicitis is not an uncommon affection in infancy and early childhood, although quite frequently the diagnosis is not made until necropsy is performed. Within five years (1902-7) Erdmann operated upon 100 children, the subjects of appendicitis, in thirty-seven of which drainage was required, in twenty-four perforation of the appendix had already occurred, and in fifty (half the series) the appendix was gangrenous. Owing to the difficulty and consequent delay in arriving at a correct diagnosis, necessarily the mortality from appendicitis in children is much higher than in adults under similar circumstances.* "That thirty-seven cases out of one hundred required drainage is a striking commentary on the necessity of early diagnosis and prompt operation." The youngest child in Erdmann's series was one year, the oldest fifteen years.

After recording a fatal operative case of appendicitis in a nursling of eleven months, Kermisson and Guimbellot cite from the literature twenty-six examples in children from six weeks to two years old. Nine occurred during the first and seventeen during the second year of life. Not a single patient under the age of eighteen months recovered after operation, and of the seventeen occurring during the second year seven recovered and ten perished. The authors, therefore, conclude that appendicitis during the first two years of life is an exceedingly dangerous affection.

Meriwether makes a plea for early diagnosis and prompt operation in all cases of appendicitis in children, and reports five examples with one death. Cole claims every case should be deemed surgical with a view to operation if possible within twenty four hours after inception of the attack.

Although Riedel believes the prognosis of acute general peritonitis in young girls (following salpingitis) is absolutely unfavorable, *i. e.*, that all such patients die, and relates the history of eight fatal cases under nine years of age, it is well-known that instances have been recorded where complete restoration to health followed celiotomy supplemented by other appropriate treatment. While it is admitted without disputation there may be encountered serious difficulty in making a differential diagnosis between peritoneal infection from the streptococcus and staphylococcus, the diplococcus of Neisser, the tubercle bacillus, and the extension of appendiceal disease, etc., this feature should not be permitted to influence the surgeon in considering the indications for operative treatment. Kelly mentions thirty-three examples of acute peritonitis in children (girls) due to extension of Neisserian infection in which there were five deaths, two following celiotomy and three without operation. Bunts operated upon a girl of ten for acute peritonitis resulting from Neisserian infection (by a lad of thirteen) followed by recovery.

In a standard text-book on the disease of children, published less than twenty years ago, appears the extraordinary statement that surgical intervention in acute intussusception (of children) has not had the effect of diminishing the death rate; that the particular objection to operation is that "there is a reasonable chance of recovery of the patient without it!" The most remarkable misleading and erroneous statement, however, is that "the few brilliant results recorded should be regarded as surgical curiosities, showing what infants may sometimes safely endure, rather than as furnishing precedents for future guidance!" Some of the later text-books, especially those presumably compiled by American authors, emphasize the erroneous teaching that in the treatment of the intussusception of infants surgical intervention should be undertaken only after all other measures have failed, i. e., as a *dernier ressort!*

Unfortunately for infantile and other humankind, the extraordinary persistence of this pessimistic attitude has not only been responsible for the mistreatment and demise of hundreds of infants the subjects of intussusception, but has constituted the greatest impediment to the intelligent application of the only rational method of treatment, viz., immediate celiotomy with reduction of the invaginated intestine. It would, therefore, appear that if the progressive surgeon would give less credence to the compiled information and instructions contained in mediocre (obsolete) and consequently worthless text-books, and place greater reliance upon his own judgment and common sense based upon practical experience, there would be less cause for critical

*With early diagnosis and prompt operative intervention, the statement seems reasonably warranted that the mortality from appendicitis in infancy and early childhood could be largely reduced. It is the writer's conviction that if operation be performed under proper surroundings, with due allowance for the immaturity of the patient, etc., the mortality should necessarily be no greater than that which obtains in adults under similar circumstances.

comment not only in this but many other surgical and medical directions!

Under the broadest interpretation of the term, there can certainly be no purely medical treatment of intussusception, whether it occur in infancy or old age; therefore, so soon as the diagnosis can be correctly made it naturally follows that surgical intervention is imperatively demanded as the only rational means of conserving life. However, instead of adopting and following this method of management it has been the custom to adhere to the obsolete text-book teaching of repeatedly postponing operation, or advising that surgery be undertaken only as a last resort, which in the majority of instances is so late in the history of the affection that no reasonable hope can be entertained for the prolongation of life from any method of treatment, medical, surgical or otherwise.* Thus may be explained the high mortality which has hitherto been thought inevitable in this class of cases.

Of all the varieties of acute intestinal obstruction, the one most frequently presenting the clearest clinical picture is intussusception. Pain, nausea, vomiting and bloody stools are the four characteristic symptoms which are practically almost invariably noted, to which may be added tympanites with evidence of an abdominal tumor (irregularity) on palpation in the majority of instances. A more comprehensive description abstracted from the writings of Clubbe may bear repetition: The sudden onset in a previously healthy baby is a peculiarity of intussusception. The child is seized suddenly, screams, turns pale, vomits, and in a short time seems to recover, only to cry again at intervals as if in pain. Soon after the first scream it may pass an apparently normal alvine evacuation, but in from two to ten hours in the larger percentage of instances blood will be passed per rectum. The abdominal mass, which may vary considerably in size, shape and position, can nearly always be detected by careful palpation when the child is anesthetized. The classical sausage shaped tumor is not always present. The child may not look ill, its pulse rate may be hardly raised, and temperature may be normal.

Over twenty years ago Treves made the significant suggestion (in favor of celiotomy) that it must be remembered the general mortality of intussusception is 70 per cent., and that 80 per cent. of the patients die before the seventh day. In quite young children the mortality is very high, and in the young, therefore, celiotomy (if done at all) should be performed within the first forty-eight hours, and if possible within the first twenty-four hours.

Of 124 infants the subjects of intussusception upon whom celiotomy was performed by Clubbe, eighty-four were saved and forty died, a mortality of less than 33 per cent. Dividing his patients into groups, his mortality was reduced one-half in each series, e. g., in the first fifty cases it was about 50 per cent., in the next fifty it was 24 per cent., and in the last twenty-four cases the mortality was about 12 per cent.

If the foregoing statistics of Clubbe are reliable, and it is presumed they are, they certainly go far toward proving the premise suggested herein, i. e., that early diagnosis and prompt surgical intervention in the intussusception of infants should result in an ultimate favorable outcome in the vast majority of instances. In further emphasis of this suggestion the statistics of Clubbe show that the first fifty patients were subjected to operation about twenty-eight hours after the initial symptom was noted, in the second fifty cases the interval was twenty-three hours, and in the last twenty-four cases only seventeen hours had elapsed; thus it will be observed that improvement in his results correspond precisely with the earlier opportunity for operative treatment, and it would therefore appear if celiotomy be resorted to within the first few hours after manifestation of the initial symptom, instead of temporizing with inflation, etc., according to present custom, the mortality could be still further reduced.

Roughton records fourteen cases of intussusception in children less than one year old (the youngest four months) with successful outcome, and suggests that after the diagnosis is made no time should be lost by temporizing with inflation, injection, etc., that operation offers the only hope of prolonging life and should be practised immediately. And Rushmore claims, as regards the age of the patient, that the mortality from operative treatment during the first six months is about 28 per cent., during the second six months 22 per cent., the third six months 18 per cent., thereafter 14 per cent., and that if operated upon within twelve hours the recoveries should average 80 per cent., after twelve hours the figures will be practically reversed.

Owing to adhesions of the invaginated intestine and other complications in chronic intussusception, and even in certain of the acute forms, it may be found impossible after celiotomy to reduce the invaginated portion. The most rational procedure

*In making these statements the writer is not unmindful of the excellent results which have occasionally followed the so-called injection and inflation plans of treatment. However, these methods are not devoid of danger, and while they may be sometimes advantageously employed as a preliminary step to celiotomy, they are not to be recommended as curative measures.

under such circumstances would naturally be immediate resection, removing as much of the intestine as necessary to secure perfect anastomosis. However, text-books and other authorities advise against such a procedure, a recent writer (Stone) commenting as follows: Immediate resection is the step which at once suggests itself, and there can be no question that in adults and older children this should be done. In infancy, however, we are met by the fact that resection is practically always fatal. The author further states he is aware of but two successful cases of resection in children under one year old, viz., Clubbe in an early case in his series resected four inches of the intestine, the child was much collapsed but finally recovered; and Frank recorded a successful resection of the cecum in a baby of seven months. "It seems at the present time, in view of these facts, useless to perform in infants an operation which is almost absolutely certain to prove fatal!" (Stone.) Where reduction of the invaginated intestine seems impossible, owing to complicating adhesions, gangrene, etc., instead of performing resection and anastomosis, which is certainly the most rational procedure, various text-book authorities, et al., recommend the formation of an artificial anus as the most advisable method of prolonging life—evidently assuming and hoping that Nature will ultimately overcome the intussusception by the process of sloughing—a procedure which is certainly not only useless, but unsurgical and consequently unjustifiable.

It is believed the foregoing pessimistic view concerning intestinal resection in infants, whether it be for the cure of intussusception or otherwise, has not been entirely borne out by the facts. Moreover, what author has ever advanced a single reasonably demonstrable, tangible or perfectly tenable theory to adequately explain why intestinal resection in infants should necessarily be almost invariably followed by prompt dissolution of the patient? Provided the operation be performed by a practical and experienced surgeon, in accordance with modern perfected technic, constantly bearing in mind the modifications necessary because the patient is an infant, why should not the ultimate outcome at least approximate that which may be reasonably expected to accrue in the adult? It must not be forgotten that not many years ago it was deemed impossible to successfully excise any considerable portion of the intestine in an adult, yet to-day intestinal resection and anastomosis represent well-recognized justifiable and successful surgical procedures. On numerous occasions it has been necessary to excise several feet of the intestine to completely eliminate malignant disease or other pathological lesion, and the patients remained well for years thereafter.

According to evidence afforded by *The Lancet* (London) over ten years ago English surgeons had become convinced that immediate celiotomy with reduction of the invaginated portion of the intestine was the most appropriate treatment of intussusception, and that other procedures, such as manipulation, inflation, injection, etc., were not only exceedingly uncertain as to ultimate results, but were attended with greater risk to life than ordinarily supposed. At that time Heaton recorded two examples in children of three and four years, the intussusception being of the ileocecal variety, in which celiotomy seven hours after onset of symptoms was followed by uninterrupted recovery. There are hundreds of similar cases on record.

In presenting this imperfect paper the writer claims nothing from the standpoint of originality nor scientific excellence, his principal object being to emphasize the following suggestions:

1. That there appears ample reason for questioning the truthfulness of the statements contained in so-called standard medical text-books and likewise in the writings of both ancient and modern authors that necessarily surgical intervention (particularly celiotomy) must be regarded as invariably less encouraging and more frequently fatal in the young than in adults.

2. That if early diagnosis be made in the surgical diseases of children and prompt surgical intervention be undertaken (remembering the certain essential modifications in management and treatment because the patient is an infant) neither major nor minor surgery in the young should necessarily be attended with greater immediate nor remote mortality than that which obtains from similar measures in adult life.

3. That barring unforeseen and unpreventable accidents the high death-rate which has hitherto been regarded as inevitable following surgical operations (particularly celiotomy) upon the young may be materially reduced by early diagnosis and prompt operation, together with the exercise of mature judgment in the application of modern scientific surgical and therapeutic principles.

REFERENCES.

ALEXANDROW: *Deutsche med. Wochenschrift*, No. 29, 1900. American Text-Book on the Diseases of Children.
BLOCH: *Hospitalstidende*, No. 19, 1909.
BUNTS: *Cleveland Medical Journal*, August, 1909.
CAMPBELL: *British Medical Journal*, May 15, 1897.
CARPENTER: *Pediatrics*, v. i., 1896.
COLE: *International Medical Journal*, May 15, 1897.
CLUBBE: *Australasian Medical Gazette*, 1907.

COMTE: Pediatrics, quoted by Morell, v. i., 1896.
ELDER: *Surgery, Gynecology and Obstetrics*, v. x., No. 2, 1910.
ERDMANN: *Brooklyn Medical Journal*, January, 1905; *Medical Record*, May 11, 1907.
FINNEY: *Old Dominion Journal of Medicine and Surgery*, March, 1910.
HEATON: *London Lancet*, June 4, 1898.
HIRST: *Therapeutic Gazette*, No. 6, 1898.
HUNTER: *Medical Age*, v. xxiv., No. 14, 1906.
JOPSON AND GITTINGS: *American Journal of the Medical Society*, November, 1909.
KELLY: Operative Gynecology, quoted by Bunts, l. c.
KIDD: *London Lancet*, October 14, 1899.
KERMISSION AND GUIMBELLOT: *Revue de Chirurg.*, October, 1906.
MCGUIRE: Trans. Tri-State Medical Assn., 1910.
MARTIN: *Therapeutic Gazette*, No. 6, 1898.
MANLEY: *Medical Record*, July 16, 1892.
MEDICAL COUNCIL: Editorial, September, 1898.
MEIGS: *Boston Medical and Surgical Journal*, September 28, 1899.
MOULE: *Australasion Medical Gazette*, April, 1910.
MERIWETHER: *Louisville Monthly Journal of Medicine and Surgery*, v. vi., No. 38.
OWEN: *British Medical Journal*, 1885, quoted by Holme, *Pediatrics*, 1896.
PETERSON: *Post-Graduate*, February, 1910.
RACHFORD: *Cincinnati Lancet-Clinic*, No. 19, 1896.
RUTHERFORD: *British Journal of Children's Diseases*, September, 1909.
ROTH: *Medical Record*, December 19, 1903.
RUSHMORE: *Annals of Surgery*, August, 1907.
RIEDEL: *Archiv. f. klin. Chirurg.*, quoted by Buntus, l. c.
ROUGHTON: *Clinical Journal*, July, 1911.
SHERRILL: Trans. Louisville Surg. Society, 1898.
STONE: *Boston Medical and Surgical Journal*, 1907.
TREVES: Quoted by Stone, l. c.
WALLACE: *Journal of the American Medical Association*, April 11, 1908.

A NEW INSTRUMENT FOR REPLACING RETRO-DISPLACED UTERI.

H. H. STANSBURY, M.D.,
BALTIMORE, MD.

The accompanying cut illustrates an instrument devised and used by me for the last two years in the treatment of uterine retro-displacements. I find it of great help and offer it to the profession for trial and criticism.

The patient is placed upon her back in the lithotomy position, the elevator introduced into the vagina, and carried behind the cervix into the Douglas cul-de sac (as one would a Smith-Hodge pessary for retro-displacement) with the rounded end of the elevator behind and underneath the body of the uterus. By simply depressing the handle gently one can easily see he has a lever under the uterus and with a very little manipulation the uterus may be thrown sufficiently forward for the left hand on the abdomen to be able to tip it quite anteriorly as in the usual bi-manual method.

This is easily done in cases uncomplicated by adhesions, but with adhesions great gentleness is necessary because they may be broken up too rapidly and damage thus be done. In this class of cases it may be used with great success, especially those refusing operation or probably preliminary to operative interference. When used every other day,

bringing the uterus up as far as possible, then inserting a wool tampon saturated with glycerine, thus holding the uterus in its improved position, an operation is sometimes avoided. I would advise against its use under an anesthetic—adhesions may be broken up too rapidly.

INDICATIONS FOR OPERATION IN DISEASE OF THE BILIARY TRACT.

1. More than one attack of true biliary colic.
2. Symptoms suggestive of upper abdominal adhesions and chronic biliary insufficiency.
3. Hydrops of the gall bladder.
4. Obstruction of the common duct.
5. The occurrence of acute infections complicating previously existing biliary disease.
6. The evidences of pancreatic disease, acute, subacute or chronic.—J. B. DEAVER in the *New York State Journal of Medicine.*

Never advise amputation for ulcers until skin-grafting has failed, unless you are dealing with ulcer of malignant type. — *Bernays' Golden Rules of Surgery.*

American Journal of Surgery
PUBLISHED BY THE
SURGERY PUBLISHING CO.
J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., N. Y., U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

SUBSCRIPTION PRICE, ONE DOLLAR
FOREIGN, SIX SHILLINGS

Original Articles and Clinical Reports are solicited for publication with the understanding that they are contributed exclusively for this journal.

It is of advantage to submit typewritten manuscript; it avoids errors.

CHANGE OF ADDRESS. Subscribers changing their addresses should immediately notify us of their present and past locations. We cannot hold ourselves responsible for non-receipt of the Journal in such cases unless we are thus notified.

ILLUSTRATIONS. Half-tones, line etchings and other illustrations will be furnished by the publishers when photographs or drawings are supplied by the author.

☞SPECIAL NOTICE TO SUBSCRIBERS☜

The "American Journal of Surgery" is never sent to any subscriber except upon a definite written order. Present and prospective readers please note this.

WALTER M. BRICKNER, M.D., Editor

New York, March, 1913.

EMETINE A SPECIFIC IN AMEBIC DYSENTERY, HEPATITIS AND HEPATIC ABSCESSES.

A few months ago (June, August, 1912), Leonard Rogers, Professor of Pathology in Calcutta, who had ten years before definitely established the causative relationship of amebic dysentery to tropical abscess of the liver, reported in the *British Medical Journal* his remarkable cures of amebic colitis by a few injections in each case of ½ grain or grain doses of hydrobromide, preferably, hydrochloride of emetine, the alkaloidal active principle of ipecacuanhua. His recent paper on "The Rapid and Radical Cure of Amebic Dysentery and Hepatitis by the Hypodermatic Injection of Soluble Salts of Emetine" (*Therapeutic Gazette,* December 15, 1912), adds to the appreciation of the value of his demonstration of a specific remedy for this dread malady.

Rogers had himself shown that large doses of ipecacuanhua exercise a controlling and often curative influence in amebic (not in bacillary) dysentery and amebic hepatitis in the presuppurative stage. Prompted by Vedder's experiments showing that emetine, the alkaloid of ipecacuanhua, inhibits the growth of the dysentery bacillus and in a very high dilution kills amebæ in bouillon cultures. Rogers tested the effects of the very soluble emetine hydrochloride on amebæ in the mucous stools of amebic dysentery, and found that in a dilution of 1 in 10,000 it immediately produced physical changes in them visible under the microscope, while in higher dilutions it also appeared to kill them. He then determined to try the drug hypodermatically in severe amebic colitis, expecting it to produce sickness, but only after it had entered the blood and had thus been able to exert its specific action on the amebæ in the body tissues.

After experimentation, Rogers came to use half to two-third grain doses of hydrochloride of emetine (equivalent to 30 to 40 grains of ipecacuanhua) dissolved in water, for adults, administered hypodermatically twice daily. He reports that he has seen no depressing symptom follow one-grain doses three times daily in severe cases. Even these large doses, thus administered, produce no vomiting, and usually no nausea. The amebæ immediately disappear from the stools and in a very few days the patient is cured. In none of Rogers' cases has there been a relapse. The two of his 25 patients who died of the disease while under the treatment were in a hopeless condition when it was undertaken. He regards a high leucocyte count as indicating a serious infection. Of ten cases with leucocytosis of 25,000 to 50,000, only two recovered under ipecacuanhua. Of five similar cases four recovered under emetine, and the fifth had a count of 61,750 and died within twenty-four hours after admission.

He thus compares his ipecacuanhua and emetine cures: "The average stay in hospital of the recovering ipecacuanhua cases was 16.4 days, and of the emetine ones 7.2 days, including one day they were kept under observation, if not urgent cases, before the treatment was begun. Further, the average number of days under ipecacuanhua before the stools became finally normal was 11.4, and the average amount of the drug given amounted to 406 grains; while the corresponding figures for the emetine treatment were respectively 2.35 days and 2 grains of the drug, equal to 180 grains of powdered ipecacuanhua."

Equally interesting is the diagnostic value of emetine injections in dysentery. In amebic dysentery the blood and mucus disappear from the stools, almost always, within three days, while in bacillary dysentery emetine exerts little or no effect.

Quite as remarkable as the effect of emetine on the intestinal inflammation is its influence on amebic hepatitis and liver abscess. It "removes the pain of an acute hepatitis in about twenty-four hours, reduces the temperature in a very few days, and, if suppuration has not already taken place, the leucocytosis also quickly subsides. * * *

Should leucocytosis persist for some time after the pain and fever have subsided, it is highly probable that an abscess is present in the liver, which had formed before the treatment was begun. In that case * * * it is only necessary to remove the pus by aspiration, and to inject one grain of emetine hydrochloride dissolved in about one ounce of water into the abscess cavity through the aspiration cannula before withdrawing it, and sealing the puncture with collodion. If a full course of emetine has not already been given, half a grain should be injected subcutaneously twice a day for three days, commencing from the day after the aspiration. The pus withdrawn should be examined by culture for bacteria, and if it proves sterile it is highly probable that nothing further will be required, for the amebæ having all been killed by the emetine, the remains of the abscess will encyst. * * * If the abscess is a very large one, a second aspiration may be required after a week or ten days."

Specific therapy has gained another triumph, and emetine will take its place with quinine, salvarsan and mercury. Indeed, in the promptness and completeness with which it destroys the invading organisms it seems to quite surpass these!—W. M. B.

PERSISTENT MOUTH BREATHING FOLLOWING ADENOIDECTOMIES.

The failure, in many cases, to relieve mouth-breathing in children by the removal of the offending adenoids is as conspicuous as it is disappointing. Various more or less satisfactory theories have been advanced to explain this failure to effect nasal respiration by the removal of the adenoid obstruction. One of these, more pleasing than practical, is the so-called habit of mouth-breathing —which puts the whole blame on the small patient and leaves the cure to its parents. A more acceptable explanation is that in many cases the operation is delayed until the bony palatal arch is high and narrow and the nares are correspondingly small—the slow, expensive and more or less incomplete relief of which is turned over to the orthodontist.

An interesting and sensible consideration of this troublesome question is that of Irving Sobotky in the *Boston Medical and Surgical Journal*, February 13, 1913. He urges a careful study of the nose itself in all adenoid cases, and a consideration of the obstructions that may also be found therein. He seems inclined to agree with those who regard inferior turbinate hypertrophy, spur and deviation of the septum, in these cases, as secondary to, rather than provacative of, adenoid growths.

Sobotky indicates the importance of distinguishing true from syphilitic and vasomotor hypertrophy of the inferior turbinate. In the first-named condition he advises removal of part of the turbinate at the same sitting as, and, for obvious technical reasons, just before the adenoidectomy. "Using the turbinate scissors and simply cutting a slice of the thickened mucous membrane of the inferior turbinate along the lower and posterior portion, parallel to the long axis of the bone, and being extremely careful not to cut the bone itself, will not cause atrophic changes. The healing will leave a linear surface scar and the cicatricial contraction will widen the nasal cavity enough for all breathing purposes."

He adds, however, that this treatment should not be undertaken during the age of puberty, at which time the nasal mucous membrane is in a state of turgescence. Electrolysis, as a means of reducing the turbinate, is effectual, but Sobotky finds it too tedious for children. Submucous resection of a deviated septum is not to be performed in patients younger than sixteen.—W. M. B.

MILITARY SURGERY.

Beginning with this issue we publish the first installment of a serial on Military Surgery. It is estimated that in 12 to 14 issues the manuscript, as prepared for the readers of this journal, will be completed.

It seems to us that this subject has been much neglected in our country. Medical officers of the Army, Navy, National Guard and Red Cross will, of course, be the ones principally interested in the methods available for the surgical therapy on the battlefield, be this at the very firing line, somewhat to the rear in the field hospitals or at the so-called base and evacuation hospitals.

But civilian surgeons, too, will find much of technical interest, leaving aside patriotic considerations which should induce every member of the profession to prepare himself for service in the event of war.

The civilian surgeon will no doubt learn much that may prove useful to him in his surgical practice away from the well-appointed hospital. He will learn how to cope with serious conditions, without the armamentarium considered indispensable in the operating room, so that immediate benefit must result from a perusal of the serial.

Dr. Gustavus M. Blech, the author, a well-known Chicago surgeon, is especially qualified

for this task, for the first time undertaken in the English language, having devoted five years to the organization, equipment and training of a large Red Cross field corps, with which many phases of surgical relief problems in the field have been studied by him.

He has studied the available literature on the surgical work during the last modern wars, with the sole view of arriving at definite conclusions from the huge statistical material, concerning the indications and contraindications of operative intervention in gunshot wounds of the abdomen, chest and head. While the technical part of the serial will be limited to surgery pure and simple, an insight into the organization of armies and their medical service will aid in elucidating the reasons for much that may appear strange to the uninitiated.

FURTHER OBSERVATIONS ON INTRAVENOUS INJECTIONS OF COLLOIDAL COPPER IN HUMAN CANCER.

The second report of Leo Loeb and his collaborators on the results of their intravenous injections of colloidal copper solutions in human cancer (*Interstate Medical Journal*, January, 1913), is not apt to arouse enthusiasm for these injections as a therapeutic procedure.

In none of the cases (and several are added to the earlier report) is there a cure or sufficient promise of a cure. In many cases there is a gradual decrease in the effect of the injections, and in several of the older cases "it is doubtful whether any progress has been made in the last few weeks." In rapidly growing tumors and those with pronounced cachexia, the authors repeat, no benefit is to be expected.

Nevertheless, these injections do cause, in many cases of inoperable cancer, a marked retrogression, and they afford considerable relief of pain. It must be remembered that the procedure is purely experimental, and in that light the observations are valuable and may ultimately prove quite useful.—W. M. B.

SPECIAL ANNOUNCEMENT.

GENITO URINARY NUMBER.

It affords us pleasure to announce that the April issue of the AMERICAN JOURNAL OF SURGERY will be devoted exclusively to Genito Urinary Surgery. The following contributions by well-known men will appear:

"Kidney and Ureter, Some Points in the Diagnosis and Management of Their Surgical Diseases," by Dr. Howard Lilienthal.

"Renal Lithiasis," by Dr. J. Bentley Squier.

"New Growths of the Bladder," by Dr. Paul M. Pilcher.

"Report of Two Interesting Kidney Stone Cases," by Dr. Bransford Lewis.

"The Operative Treatment of Stone in the Ureter," by Dr. Hugh Cabot.

"A New Method of Facilitating the Passage of Descending Ureteral Calculi and of Dilating the Ureter," by Dr. Leo Buerger.

"Surgery of the Kidney," by Dr. Ramon Guiteras.

"Diagnosis of Surgical Affections of the Kidney," by Dr. E. O. Smith.

"Prostatic Calculi Complicating Prostatectomy, Report of a Case," by Dr. H. A. Fowler.

Subject to be announced, by Dr. Clarence Martin.

Surgical Suggestions

A mild degree of shock causes leucocytosis; severe shock paralyzes the leucoblastic function.

Sequestration of blood in the lower extremities by compressing the veins at the upper end of the thighs with elastic bandages, will reduce the bleeding in brain operations.

A history of "bleeding" is not always essential to a diagnosis of hemophylia. The occasional acquired type of hemophylia must not be forgotten.

Tincture of iodine painted over the dry skin is the quickest and probably the best means of disinfecting the field of operation. No washing of the skin should be done unless on the day before. If shaving has not been done previously, shave dry before painting with iodine.

In post-operative blood examinations it must be remembered that both ether and chloroform narcosis produce a 30 per cent. increase in the leucocytes which lasts for about twenty-four hours, and that leucocytosis is also induced by saline infusion and by purgation.

The "ichthyol varnish" (50 per cent. aqueous solution of ichthyol) is a very convenient means of applying this drug to the skin when an ointment is not desirable, e. g., to the face (to avoid bandaging) or over an area of periphlebitis where it is desired to also employ a wet dressing.

Surgical Sociology

Ira S. Wile, M.D.
Department Editor

In industrial accidents there are many contributing elements which make it difficult to fix the responsibility. Wise legislation leading to the prevention of accidents must depend upon an appreciation of all the responsible factors.

In 1910 the employers of Minnesota gave their opinions as to the causes of industrial accidents within the state and apportioned the various causes as follows:

The hazards of industry	78.5 %
The contributory negligence.....	14.6 %
The negligence of the injured....	2.7 %
The negligence of fellow workers	2.2 %
The negligence of the injured and fellow workers	2.0 %
The employer less than.....	1.10%

Obviously the employers administered a coat of whitewash to their consciences so as to free themselves from all responsibility.

The decennial reports of the German Bureau dealing with industrial accidents made the following distribution of the main causative factors of industrial accidents for the ten years ending in 1907:

The fault of employer.....	12.06%
The fault of workman.....	41.26%
The fault of both.....	.91%
The fault of fellow workman or third party	5.94%
The fault of the general hazard of industry	37.65%

A third point of view may be represented from the factory inspectors' investigations in Wisconsin during 1908 when they distributed the basic elements of accidents in the following proportions:

The fault of employer.....	11.35%
The fault of workman.....	23.53%
The fault of both.....	7.14%
The fault of fellow servant.....	5.88%
The fault of the hazard of industry	52.10%

In view of the fact that there are annually in the United States 35,000 deaths and two million accidents in industry, it is of the utmost importance to recognize the varied factors leading to this terrific and scandalous death and accident rate. Fully three times as many men, women and children are killed or injured in American industries in proportion of the number employed as in any other country. This in itself is a severe arraignment of our industrial conditions. It is apparent from a study of accidents that from one-third to one-half of them are preventable. It is readily comprehended that practically all accidents save those inherent in industry are preventable. Even the general hazard of industry may be reduced through the invention of devices designed to protect workmen.

The first step in legislation should look forward to the promotion of laws designed to lessen the number of accidents. Remedial legislation should not waste its strength entirely on plans for the alleviation of the conditions created through death and accident in industry. Education for prevention in schools and factories should be thoroughly studied, encouraged and made mandatory. General laws leading to the reduction of child labor are indirectly laws leading to the prevention of industrial accidents, inasmuch as youth with its inexperience and carelessness is a marked factor in maintaining high rates of injury. Other indirect preventive legislation would include those laws dealing with the hours of labor, the days of rest, and minimum wage laws.

Legislation which focuses its attention merely upon employers' liability or workingmen's compensation fails to reach down to the root of the matter. The problem of industrial accidents includes, it is true, the relief of the poverty and the distress incident to the loss of lives and to the temporary or permanent disabilities inflicted, but the true solution of the problem consists in laying stress upon the preventive measures rather than paliative enactments.

The first step to be taken should be to make obligatory the enforcement of laws, old or new, which require the use of safety appliances in our factories, mines, mills and shops. There should be complete specification as to the general nature of the appliances that are applicable to pulleys, flywheels, gears, circular saws, knives and the various other types of machinery with movable parts that are sources of danger to the employees whose duty it is to operate or care for them. Furthermore, there must be an adequate force of inspectors to supervise the installation of such devices, to point out their need, and to report failures to place them when ordered. The responsibility for the use of safety appliances should be fixed upon both the employers and the employees—the former to provide, and the latter to use the devices as the hazards of the industry demand.

It is important that there should be a forceful group of factory inspectors with abundant funds behind them in order to secure the safety of employees. While there are many laws dealing with safety appliances, they, unfortunately, have been more honored in the breach than in the observance, as may be judged from the fact that during 1909 in the State of New York there were only seven prosecutions for violation of the laws referring to safety appliances.

From the standpoint of economy, social service, and civic progress, the axe should be laid at the root of these industrial catastrophes and all force and power should be given to the blows that are designed to cut out this parasitic growth from our national life.

In 1910-11, in the State of Minnesota, over ten thousand accidents occurred; 259 were fatal, 297 were serious fractures, 2898 were crushings, and 2528 severe lacerations. The disability from all classes continued for more than three months. This is a sad picture of the destructive side of industry. It is a conservative estimate because the laws regarding reportability of industrial accidents do not

suffice to bring all of them to the attention of the Bureau of Labor.

The reduction of industrial accidents must grow from a broad policy of conservation of human life. The responsibility for industrial accidents falls not alone upon the industry, employers and employees, but upon society as a whole which countenances the continuance of such preventable, pauperizing, and invaliding processes without an endeavor to lessen them.

Books Received

Surgery and Diseases of the Mouth and Jaw. A Practical Treatise on the Surgery and Diseases of the Mouth and Allied Structures. By Vibray Papin Blair, A.M., M.D., Professor of Oral Surgery in the Washington University Dental School, and Associate in Surgery in the Washington University Medical School. Octavo; 638 pages; 384 illustrations. St. Louis: C. V. Mosby Company, 1912. $5.00.

The author presents to us an extremely comprehensive and well written volume on the Surgery and Diseases of the Mouth and Jaws. The forty-four chapters included in this volume we believe cover as thoroughly as possible every affection of these parts. The first few chapters give information on the anatomy of the special parts, tumors, hemorrhage and shock, wounds and injuries. We specially commend the chapters on fractures of the jaw and their treatment, and on clefts of the lip and alveolar process. The chapters on extraction of teeth belong more properly to the dentist but must necessarily be included in a book of this kind. About forty pages are devoted to the subject of cancer of the tongue, its symptoms and the operations for its removal. We believe that the author exceeds the scope of his book by including the subject of tic douloreux, although his description of this condition and its cure are so excellently portrayed that it is well worth reading.

The volume is beautifully illustrated and is completed by an excellent bibliography.

Surgical Operations With Local Anesthesia. By Arthur E. Hertzler, M.D., Surgeon to the Halstead Hospital, Halstead, Kan., and to the Swedish Hospital, Kansas City, Mo. Small octavo; 205 pages; 104 original illustrations. New York: Surgery Publishing Co., 1913. Price $2.00.

This excellent manual bears the authority of a distinguished surgeon than whom no one in this country has contributed more to the practical technics of local anesthesia.

The book consists of 17 chapters, of which the first four deal with General Considerations, General Principles, Technic, and Drugs Employed. The remaining chapters describe in detail the technic of local anesthesia in a large variety of individual operations, including not only those commonly performed in this way, but also many others, such as mastoid operations, trachelorrhaphy, perineorrhaphy, etc. With each of these the nerve supply is indicated, and all the special considerations are mentioned. The many excellent original drawings add much to the precision of the text. In selecting operations for description Hertzler had in mind the needs of the general practitioner and the surgeon who works without the advantages of a hospital. He therefore purposely omitted operations which require considerable experience in the use of local anesthetics. Moreover, his descriptions present, for the most part, his own methods. Nevertheless, the careful reader of this work would have no difficulty in applying the technics to conditions not considered, or in modifying them to his own operative methods.

The employment of quinine as a local anesthetic is described in detail, and the behavior of this drug in the tissues is clearly presented. Nerve blocking and perineural infiltration are described and their indications laid down. Bier's intravenous anesthesia is only briefly referred to.

The book is artistically prepared, in typography, paper, illustrations and binding. The numerous marginal headings in red ink are both helpful and attractive.

Minor Surgery. By Leonard A. Bidwell, F.R.C.S., Senior Surgeon to the West London Hospital, Dean of the Post-Graduate College, etc., etc., *Second Edition*, Revised and Enlarged. Octavo; 299 pages; 129 illustrations. London: University of London Press, 1912.

No effort at an authorative manual was made by the author. He has set down the principles and technic of treatment of minor surgical conditions according to his own experience. A number of ingenious devices which he has employed to advantage are described. The book deals with operative surgery and not with minor surgical diseases. Students of medicine must have found Bidwell's book a very useful one for this, the second edition, has appeared within a twelve-month. We say "students" advisedly for we believe that the work would appeal more strongly to them than to general practitioners of any experience or to specialists.

Golden Rules of Surgery. Especially intended for students, general practitioners and beginners in surgery. By Augustus Charles Bernays, A.M., M.D., F.R.C.S., Eng., Life Member of the German Society for Surgeons of Berlin, Chief Surgeon Lutheran Hospital and for twenty years Professor of Anatomy and Surgery, St. Louis. *Second edition*, revised and rewritten by William Thomas Coughlin, M.D., Assistant Professor of Surgery, Chief of Clinic, St. Louis University Medical School, St. Louis. Octavo; 280 pages. St. Louis: C. V. Mosby Co., 1913. Price $2.25.

The first edition of this little collection of surgical dicta by the late Dr. Bernays was published in 1906 and was based in large part on Harry Fenwick's Golden Rules of Surgery. In this edition Dr. Coughlin has added many, subtracted some, and rearranged most of the "rules." These are much like the "Surgical Suggestions" published in each issue of the American Journal of Surgery, the first edition of which in book form appeared about the same time as Bernays' Golden Rules. The book is composed of classified paragraphs of terse surgical reminders. They constitute useful reading—especially to the inexperienced surgeon—although we cannot agree with the authors concerning the correctness of all of them.

The Principles and Practice of Obstetrics. By Joseph B. De Lee, A.M., M.D., Professor of Obstetrics at the Northwestern University Medical School; Obstetrician to the Chicago Lying-In Hospital and Dispensary, and to the Wesley and Mercy Hospitals; Consulting Obstetrician to the Cook County and Providence Hospitals, etc. Large Octavo; 1060 pages; 913 illustrations, 150 of them in colors. Philadelphia: W. B. Saunders Co., 1913.

This is a model text-book. It should appeal to an unusual degree to the student and practitioner, and receive due consideration from the specialist. The author has succeeded in blending into a harmonious whole his long and varied experience, combined with all the best and most recent teachings and acquisitions gathered from the world's literature, and he has presented the subject in a concise, pleasing and masterly style. The profuse and well executed drawings from the hands of Parker, Amidon and Becker, of both gross and microscopic specimens executed with equal skill and care, enhance the value of the book greatly. The legends accompanying the illustrations are unusually complete and hence serve to save much space in the text. Each chapter concludes with a short bibliography selected to cover articles that give a survey of the literature.

The author's treatment of the subject of obstetrics is warmly to be commended. Anatomy and physiology are described from the most recent view-point, and yet with due reserve toward pure hypotheses. Pregnancy, labor and the puerperium, with the pathological conditions incident to these conditions, are treated with the utmost detail. Operative obstetrics, including forceps, version, craniotomy, embryotomy, hebostomy and Cesarian section are carefully described and elucidated by original drawings.

It is unnecessary to review in detail the contents of this volume. It will suffice to emphasize a few important points which illustrate the methods and teachings employed and recommended by the author. The importance of the husband in obstetrics as a source of infection to mother and child is emphasized. In tuberculosis early interference before the third month is recommended. The "touch pictures" which graphically portray what the examining finger encounters are of great value, as is the picture which assembles and brings before the eye the site of the various injuries of the parturient canal. Throughout the teaching is laudably conservative. Primary routine repair of the cervix and late secondary perineorrhaphy are warned against. Local treatment in puerperal sepsis is entirely discarded. In the reviewer's opinion, however, De Lee exaggerates the subsequent danger of endometritis, etc., in early abortion, if the uterus is not curetted.

These few points show some of the author's opinions. He has, however, described all accepted methods with great fairness, so that the view of all authorities may be found within his book. We know of no other text-book on obstetrics which will prove of greater value or more attractive than this one which combines originality, conservatism and minutiae of detail in a pleasing form.

Genito-urinary Diseases and Syphilis By HENRY H. MORTON, M.D., Clinical Professor of Genito-urinary Diseases in the Long Island College Hospital; Genito-urinary Surgeon to the Long Isand and Kings County Hospitals and the Polhemus Memorial Clinic, etc., etc. *Third Edition, Revised and Enlarged,* Octavo; 605 pages; 275 Halftones and Photo-engravings and 18 Full-page Insert Plates, 11 of which are in Colors. Philadelphia: F. H. DAVIS COMPANY, 1912.

Without assuming any great pretensions, this book offers a good working guide for the treatment of genito-urinary diseases. The exposition is concise and orderly, and the statements, are clean-cut and invariably sensible. The author calls largely upon his own experiences, and where there may be deficient he gives a judicious presentation of the work of others. The weakest portions of the book are those devoted to pathology; the strongest and fullest are the therapeutic. The section on cystoscopy, however, is inadequate. In most matters, the author reveals an acquaintance, if not an experience, with some of the newer phases of the subject; thus he mentions Beer's important work upon the treatment of bladder papillomata with the high frequency Oudin current and the phenolsulphonephthalein test of Geraghty and Rowntree. The illustrations are ordinary.

The Pituitary Body and Its Disorders. Clinical States Produced by Disorders of the Hypophysis Cerebri. By HARVEY CUSHING, M.D., Associate Professor of Surgery, the Johns Hopkins University, Professor of Surgery (Elect) Harvard University. *An Amplification of the Harvey Lecture for December, 1910.* Octavo, 341 pages; 319 illustrations. Philadelphia and London: J. B. LIPPINCOTT COMPANY, 1912. *Price:* $4.00.

With the modest statement that his book is an amplification of the Harvey Lecture for December, 1910, Cushing introduces us to a work that bids fair to be classic. At the outset, it may be stated that some or even much of the careful and painstaking and ofttimes brilliant work of Cushing and his associates may prove to be incorrectly interpreted, for that is not infrequently the fate of part of great pioneer work. But it may also be stated with fair assurance that the basic work, the broader principles that are laid down, will remain. And Cushing's volume reads like a novel, besides. One is impelled to read it at every possible opportunity until the last page is completed. The reason for this lies only in small part in the delightful style employed by the author; it is in far greater part due to the fact that Cushing's studies are of vital, all-absorbing interest to all progressive physicians, be they internists or specialists of any description (neurologist, ophthalmologist, surgeon, rhinologist, pediatrist, gynecologist, urologist, etc.) or be they of the group especially devoted to pure research.

The reviewer feels that it is far wiser to review a work like Cushing's by presenting his general impressions (even here repressing a great enthusiasm) than to attempt to offer some of the numberless points of interest to the reader. To mention the few trifling errors of detail would be of no value. There is but one general adverse criticism to offer: Cushing's statements are occasionally rather diffuse and hedged in by limitations where we would expect them to be concise and to the point.

The publishers are to be congratulated on their share in preparing the book for the reader: the illustrations are beautifully rendered, the text is free from typographical error, and the volume is attractively bound and printed.

Medical Diseases of Children. By T. R. C. WHIPHAM, M.D. (OXON.), M.R.C.P.; Physician to the Evelyna Hospital for Sick Children; Lecturer on Diseases of Children at the North-East London Post-Graduate College, etc. Octavo; 417 pages; sixty-seven illustrations. London: UNIVERSITY OF LONDON PRESS, 1912.

In this book an attempt is made to compress into 400 pages an account of the etiology, diagnosis, symptoms and treatment of all the medical diseases affecting children. This is obviously an impossible procedure and the result of the attempt is a book, the contents of which resemble that of a quiz compend. As an example of this may be cited the treatment of marasmus which is summed up in fifteen lines, in which occurs the following directions for treating marasmus in older infants: "To those over six months of age, cow's milk well diluted may be given. Sugar should be added but no cream." The adequacy of these directions is evident. Why the author should give space to such unusual conditions as gallstones, hydatid cyst, exophthalmic goiter or chloroma, when subjects like the above are so superficially considered, is not clear.

This type of book, which aims to embrace so large a number of subjects in a limited space, is not needed where there are such excellent English text-books on pediatrics as those of Still, Cautley or Sutherland, and it would seem that the efforts of authors could be much more wisely employed in a complete development of one particular subject rather than in a superficial consideration of a long list of diseases.

The Treatment of Diseases in Children. By G. A. SUTHERLAND, M.D., F.R.C.P., Physician to Paddington Green Children's Hospital, to the Hampstead and North-West London Hospital; Late President, Section for Diseases of Children, Royal Society of Medicine. *Second Edition.* Octavo; 403 pages. London: HENRY FROWDE, HODDER AND STOUGHTON, 1913.

As stated by the author in the preface to this, the second edition of his book, his aim has been to provide a practical guide to the young practitioner in the treatment of diseases of infancy and childhood. In this attempt, he has been entirely successful. The book sets before the reader in a concise and clear style, a rational course to be pursued by the physician in the treatment of the various ailments; for as the author expresses it, "It has been considered desirable rather to give fully one definite line of treatment than to enumerate all the remedies which have been employed more or less successfully in the diseases discussed." It is this characteristic which gives to the book its great practical value.

Of particular excellence is the chapter dealing with the treatment of cardiac disease, where the author emphasizes the frequency of the occurrence of cardiac signs and symptoms such as dyspnea and palpitation in children who

have no organic cardiac disease. These very common cases are well described and the physician is warned against the treatment of the heart itself as the cause for the symptoms is to be found elsewhere, usually in the gastro-intestinal or nervous systems. The chapter dealing with anemia is also very good and mention is made of the hypodermatic use of ferric salts which seems to be growing in popularity.

This book, like so many others of the Oxford Medical Publications, though the print is large and the volume contains 400 pages, is nevertheless extremely light in weight and therefore very easy for the reader to handle. It is unfortunate that the index is not more complete.

Medical Men and the Law. A Modern Treatise on the Legal Rights, Duties and Liabilities of Physicians and Surgeons. By HUGH EMMETT CULBERTSON, Esq., of the New York and Ohio Bars; Contributing Editor to many Legal Publications. Octavo; 325 pages. Philadelphia and New York: LEA & FEBIGER, 1913. Cloth, $3.00, *net.*

This interesting work appears to the reviewer, who is not a lawyer, to be an authoritative and fairly comprehensive presentation of the body of the law as it affects the practice of medicine, i. e., as it concerns the mutual relations of physician, patient and public. Every medical practitioner should be familiar with his legal duties and his legal rights and with those technical (and usually ethical) errors of professional conduct that would constitute liabilities. He will find them stated here. A summary of the chapters will sufficiently state the contents of the work: I. Introductory. II. Definitions (e. g., Physician, Surgeon, Osteopathy, Midwifery, Bonesetter, Optometry, etc.). III. Who May Practice Medicine and Surgery. IV. Relations of Physician to Patient. V. Compensation. VI. Malpractice or Negligence. VII. Criminal Liability of Physicians and Surgeons. VIII. Exemptions of Physicians and Surgeons. IX. Physicians and Surgeons as Witnesses. X. Right to Protect Professional Reputation. XI. Validity of Contract Restricting Exercise of Profession. XII. Wills.

The Modern Materia Medica. The Source, Chemical and Physical Properties, Therapeutic Action, Dosage, Antidotes and Incompatibles of All Additions to the Newer Materia Medica that are Likely to be Called for on Prescriptions, together with the Name and Address of the Manufacturer or Proprietor and, in the Case of Foreign Articles, of the American Agent. *Third edition,* revised and enlarged. Duodecimo; 282 pages. New York: THE DRUGGISTS CIRCULAR, 1912. Price $1.00.

The subtitle of this book amply describes its contents. The newer pharmaceutical preparations are so numerous that one cannot remember the names of half of them. This compilation is a sort of dictionary and directory of the most important of these and a descriptive review of their composition, actions, etc. It is, therefore, distinctly useful.

The Practice of Dentistry. A Practical Treatise upon the General Practice of Dentistry, Operative and Prothetic, Exclusive of Orthdontic Practice. By LEO GREENBAUM, M.D., D.D.S., formerly Dean and Professor of Clinical Dentistry, Materia Medica and Anesthesia in the Philadelphia Dental College, and MAX GREENBAUM, D.D.S., formerly Quig Mastor in the Philadelphia Dental College. Large octavo; 836 pages; 350 illustrations. New York and London: D. APPLETON AND COMPANY, 1912.

We consider this volume an excellent addition to the many new treatises that have recently appeared for the treatment of dental conditions. It is most complete, taking into consideration the various substances used in the filling of teeth and their general effect. The advantages of one method of filling over another are ably discussed. A special section deals with the extraction of teeth. The second part of the volume is devoted entirely to Prosthodontia. Excellent illustrations make interpretation of the reading matter very easy.

Progress in Surgery

A Résumé of Recent Literature.

The Rapid and Radical Cure of Amebic Dysentery and Hepatitis by the Hypodermatic Injection of Soluble Salts of Emetine. LEONARD ROGERS, Calcutta, *The Therapeutic Gazette,* December 15, 1912.

In this very interesting article, Rogers, who for a number of years has advocated large doses of ipecac as treatment for amebic dysentery, describes the results he has obtained by the use of one of the active principles of this drug, viz. emetine. The cases reported were seen and studied in Calcutta, India, where as Rogers has pointed out, amebic colitis in a very common disease and leads to a great many deaths. The use of ipecac by mouth in large doses resulted in a considerable reduction in the mortality of the disease and even was of much service in aborting pus formation in the liver when given in the presuppurative stage of hepatitis. By this treatment the death rate from liver abscess in the British army has been reduced to one-third of its previous figures. The value of the ipecac appeared to be due to its emetine content, since Vedder had shown that even in solutions more dilute than 1 to 10,000 amebae were at once killed. This led Rogers to attempt the use of emetine in his colitis cases.

The results he has obtained are little short of miraculous, for of twenty-five cases treated, twenty-one completely recovered. The drug is given in half grain doses dissolved in water. It is administered hypodermatically and rarely causes pain. It is given twice a day. Strangely enough, vomiting does not occur and even nausea is rarely complained of. The drug seems to have no depressant effects whatever. Quite as remarkable as the number of cases cured, is the rapidity with which the cure is effected. The average duration of the patients stay in the hospital was 7.2 days, and the average number of days before the number of stools became normal was 2.35 days! So specific does the author consider emetine that he advises its use for diagnostic purposes, for if the dysentery is not due to amebae it has no therapeutic value whatever. In amebic cases, the parasites disappear from the stools in 24 hours.

Equally as interesting are the results obtained in amebic liver abscesses, where by simple aspiration of the pus and injection of emetine into the abscess, the organisms are killed and the inflammation subsides.

If the results described by Rogers are corroborated in other cases, and there seems to be no reason why they should not be, we have here a specific remedy for a common and heretofore very intractable disease, comparable in its efficiency to mercury in syphilis and to quinine in malaria.

Primary Cancer of the Vermiform Appendix. J. M. GRAHAM, Edinburgh, *Edinburgh Medical Journal,* January, 1913.

Graham reported six cases of his own and has found 172 cases of primary cancer of the appendix previously reported in the literature. The main facts of interest in connection with his own cases are the following: All were obtained at operations, in four of the cases performed for symptoms of appendicitis. The presence of the tumor was suspected at operation in three cases; in the other cases it was found on longitudinal section of the organ. The age in all the cases was under thirty. The tumor was situated at or near the tip in four cases, in the middle third in two cases. The tumors had a characteristic yellowish color, and in all the cases the lumen was obliterated at the site of the growth. Signs of old peritonitis were found in every case at the site of the growth. Concretions were present in two cases and a whipworm in one. Microscopically the tumors are chiefly spheroidal-celled cancers; in three cases they represent a transition between spheroidal-cell and adeno-carcinoma. No enlarged gland or metastases were observed.

Hepato-Cholangio-Enterostomy. PROF. H. J. LAMERIS, Utrecht. *Zentrablatt für Chirurgie,* December 7, 1912.

Lameris reports a case of chronic jaundice, in which at operation removal of all the excretory ducts of the liver was found necessary owing to involvement by primary new growth. In order to establish a circulation of bile into the intestine, he removed a section of the liver and sewed by a lateral suture the opened upper end of the jejunum to this raw area. Two months later the patient was discharged, without icterus and with normal colored stools. Six months later the patient died of pneumonia. At autopsy patent biliary ducts opening into the section of adherent intestine were unequivocably demonstrated.

Spasm of the Pylorus and Congenital Pyloric Stenosis. HENRY KOPLIK, New York. *New York Medical Journal,* January 11, 1913.

Koplik divides his cases into three groups: 1. Pure spasm of the pylorus without any palpable pyloric tumor. 2. Pyloric spasm with relative and actual stenosis, with slight or marked thickening or hypertrophy of the tissues of the pylorus. 3. Congenital hypertrophy of the pylorus, so called, with stenosis. The cases differ only in degrees from the second group and merge into these. Koplik is convinced that the vast majority of all three groups recover after purely medical treatment. It is only in groups (2) and (3) that surgical intervention might be considered, but inasmuch as he has been successful with medical treatment in about 90% of his cases, he believes that even here, surgery will rarely be found necessary.

Pyloric Obstruction With a Comparative Study of the Normal Stomach of Infants. G. R. PISEK and L. T. LE WALD, New York, *Archives of Pediatrics,* December, 1912.

Pisek and Le Wald believe that Roentgen examination of infants, in whom pyloric stenosis is suspected, will prove of considerable value. The numerous illustrations of bismuth radiographs accompanying the article point clearly to this fact. The authors think that in the case of the normal baby's stomach, the food, as shown by the bismuth shadow, begins to leave through the pylorus within a few minutes after entering the stomach. In the case of a baby with pyloric spasm however, the pictures show that very little has left the stomach even after twenty minutes, and that at the end of 3¼ hours there is still some bismuth in the stomach. The authors advocate employment of bismuth meals in all cases of pylorospasm and believe that careful study of the X-ray picture should point out those cases which can be cured by operation only.

Clinical Data on Malignant Renal Tumors. W. I. BRAASCH, Rochester, Minn., *Journal American Medical Association,* January 25, 1913.

Braasch reports the experience of the St. Mary's Hospital clinic in operating on eighty-three maglignant tumors of the kidney up to July 1, 1912. The most important symptom in these cases is probably hematuria, which was observed in 64 per cent., as a primary symptom in 36 per cent. and as the only symptom in 10 per cent. In forty-one cases, or 77 per cent., it was noted more than a year before the patients presented themselves for operation and gross blood was found in the urine at the time of examination in thirty-three, or 40 per cent. of the cases. As observed by the patient himself, the symptom may be of doubtful value and possibly due to some passing condition, or it may have been neglected and forgotten. The presence of tumor may be of uncertain diagnostic value, tumors of surrounding organs may simulate kidney tumors and vice versa, and palpation may be uncertain on account of the position of the kidney, or the tumor or in fat individuals. Large kidneys may simulate tumor. Pain is due to pressure on nerves or to increased kidney tension and may be misleading, simulating gall-bladder disease or lumbago. Pus may occur in the urine, but it is usually due to secondary infection, but it may be so marked as to suggest pyonephrosis. Evidence of circulatory disturbance is commonly found with the so-called hypernephroma or mesothelioma. It is so frequent as to indicate a vasomotor dilating effect due to the toxins absorbed from the tumor. Dilated superficial veins of the face and recently appearing varicocele are suggestive. Braasch goes at length into the different diagnoses. The conditions most easily confused are (1) "essential" and nephritic hematuria, (2) retroperitoneal tumor, (3) bilateral cystic kidney, (4) closed pyonephrosis. Other aids to diagnosis are a dry cough of recent origin, the cystoscopic inspection, urethral catheterization, estimation of renal function and pyelography. The latter should not be employed unless other means fail. Among the eighty-three patients operated on for malignant tumor, the surrounding tissues were so involved as to render nephrectomy impossible in twenty-two, and the clinical records also show twenty-one other patients who were considered inoperable, though the diagnosis was considered reasonably certain. Of the sixty-one who underwent nephrectomy seven died in the hospital; of fifty-one remaining patients that could be traced seventeen were alive more than one year, twelve after three years, four after five or more years, and one after eight years. Of the twenty-seven reported dead nine died within a year after operation, two lived one year, four lived two years and four lived three, four and five years, respectively, after operation. These results compare favorably with other malignant abdominal growths. In conclusion Braasch says: "I wish to emphasize the importance of immediately ascertaining the source of every hematuria. Of the fifty-three patients operated on for malignant renal tumor who had a definite history of hematuria, but eighteen, or 34 per cent., had been advised to be examined for its source. Hematuria, particularly when so well marked as to color the urine, is always to be considered a sign of some grave condition in the urinary tract. In fact, it would be conservative to regard every case of hematuria as the result of a malignant process until it can be definitely proved to be otherwise. Renal tumor may lie dormant or grow insidiously over a period of years and by the time that hematuria, tumor or pain calls attention to its existence, it should receive immediate surgical attention."

The Phthalein Test for Renal Functions. J. T. GERAGHTY, Baltimore, *Journal American Medical Association,* January 18, 1913.

Geraghty says that the value of a renal functional test is partly in determining whether one kidney is sufficient but more to obtain accurate knowledge of the renal lesion in nephritis, the estimation of the total function in cases of urinary obstruction and for diagnosis in revealing unsuspected lesions or confirming suspicions of such. Two years ago Geraghty and Rowntree reported a method of estimating the excreting power of the kidneys by means of phthalein. The technic of the method is given as follows: "One c.c. of phthalein solution (6 mg.) is injected deep into the muscles, preferably the lumbar muscles, and the patient instructed to void at the end of two hours and ten minutes, and again at the end of two hours and ten minutes from the time of injection, each specimen being kept separate. The drug should appear normally in about ten minutes, and this much time is consequently allowed for its appearance. In this method no account is taken of the time of appearance, the main reliance being placed on the quantity excreted. This method is extremely simple." In cases with urinary obstruction a catheter must be employed and the time of appearance is estimated the collection being made for two separate hours from the time of appearance of the drug in the urine. The estimation of the amount of drug excreted is made by a modified Hellige colorimeter quite accurately for practical purposes with two graduated test-tubes. The test has been employed now in over 200 cases of nephritis of varying types, approximately 350 cases of urinary obstruction, mostly prostatic cases, in 150 cases of unilateral or bilateral disease, in conjunction with ureteral catheterization, and in 1,000 other cases as a part of the routine examination. This added experience with the test confirms his earlier conclusions as to its reliability and accuracy. Brief details are given of a number of cases. It would be well to keep in mind in using it that it is only a test of

the excreting power of the kidney, but furnishes in conjunction with ordinary clinical examination accurate information that can be obtained at present in no other way.

Dystopic Kidney. S. C. PLUMMER, *Surgery, Gynecology and Obstetrics*, January, 1913.

Dystopic kidney in contradistinction to movable, or floating kidney, is abnormally situated in the body, never having occupied its normal position. The kidney becomes fixed in an abnormally low situation owing to arrest in its embryonic ascent from the small pelvis. Alterations in size and shape frequently follow from imperfect development or from adaptation of the kidney to its anatomical environment. In size and shape the dystopic kidney is generally approximately normal, suffering changes which are due to its abnormal environment, i. e.; pressure from the sacred promontory from the large gut and uterus and adnexa. It is most frequently found on the left side and is, with the rarest exceptions, retroperitoneal. The adrenals do not accompany the dystopic kidney. The latter is often associated by defects in the genital organs of both sexes. The condition seems more common in women than in men, possibly this is due to the fact that pelvic examinations are more common in females.

The symptoms are often vague and simulate neighboring organs. In pathological conditions of the kidneys there will be the usual symptoms. Palpation is of help in some cases. Cystoscopy, ureteral catheterization, ureteral bougies for x-ray are of chief diagnostic help.

In deciding upon the proper treatment of dystopic kidney, one must take into account its functional capacity, its pathological condition and also those of the other kidney. In three of the nephrectomies done for this condition autopsy revealed the fact that the dystopic, removed kidney was solitary. There should be no operative interference unless the symptoms are severe. Occasionally the uterine adnexa are diseased and attention to these may eliminate all symptoms thus saving the dystopic kidney. The operation of choice is dislocation of the kidney and re-implantation in a location where it will not be a mechanical hindrance. As a last resort nephrectomy should be performed. Ventral laparotomy is alone to be considered. If the condition is found during pregnancy, the latter should be carefully considered and the treatment determined on the merits of each case.

The Possibility of Repeated Pregnancy Following the Classic Caesarian Section. (*Die Möglichkeit einer erneüten Schwangerschaft nach dem klassischen Kaiserschnitt*) P. C. T. v. D. HOEVEN *Zentralblatt für Gynäkologie*, December 21, 1912.

V. d' Hoven observes that while the immediate results following the classic Caesarian Section are very good both for mother and child, there nevertheless remains a very decided predisposition toward sterility. The author claims that adhesions occur in from 64% to 84% of cases, in which the uterus becomes fixed to the abdominal wall, to the omentum and intestines, and that these adhesions also embrace the tubes and ovaries. In half the number of cases of his Caesarian Sections v. d'Hoeven reports permanent sterility. This presents a new aspect to the operation of the classic Caesarian Section from the viewpoint of its actual value as preserving life. The author believes much more may be expected from the extraperitoneal method of uterine section or even from Hebeostomy.

Serotherapy Applied in the Treatment of Serious Vomiting of Pregnancy. (*La Sérothérapie appliquée au Traitement des nourissements graves de la Gestation*) G. FIEUX, *Annales de Gynecologie et D'Obstetrique*, December, 1912.

Fieux made use of normal human serum, of serum obtained from a patient gravid three months, and also horse serum in the treatment of the more grave vomiting of pregnancy. Altogether four cases were observed, but the author has had such favorable results that he feels in the serum treatment we have almost a specific remedy to combat this "intoxication" of pregnancy. The horse serum has a special value because it can the more readily be procured while serum of an early gravidity is not always at hand. Several injections of from 15 cc. to 20 cc. are used; the first injection shows a favorable influence. The vomiting ceases after a week of treatment.

Some of the Reasons for Advising Early Operations for Fibroid Tumors of the Uterus. RUFUS B. HALL, *American Journal of Obstetrics*, January, 1913.

Rufus emphasizes the dangers to the patient who is a subject of fibroid diseases, even though the case has pursued a mild course for years. These dangers are many and varied including: First, secondary changes in the tumor. Second, heart symptoms. Third, pyosalpinx and supperating ovary. Fourth, ovarian hematoma, with infection of its contents. Fifth, torsion of the uterus. These call for early relief. Besides these conditions there are the essential degenerative softening, calcareous, changes, also suppurative which may demand operation at any time.

Ovarian Tumors Complicating Pregnancy, Delivery, and the Puerperium. CHANNING W. BARRETT, *Surgery, Gynecology and Obstetrics*, January, 1913.

Barrett claims that surgery of pregnancy is in the development stage. We have come to regard the rights of the child as more nearly on a par with the mother and that in the presence of pathology, the latter and not the ovum should be removed. In the presence of a tumor we should remember that we have two patients with one tumor and not one patient with two tumors. In a series of 114 cases collected by the author, 76 were operated for removal of the tumor during pregnancy previous to full term; 73 mothers recovered and 63 mothers went on to term. 38 cases were unoperated before term. At term the mortality is higher from operation, being in the ratio of 18.4% as compared with 2.6% in cases operated before term. The most favorable results are to be found in cases operated upon during the first half of pregnancy. Compared to pregnancy at term, however, operations for the removal of ovarian tumors are much more favorable during the second half of pregnancy. Bilateral ovarian tumors were removed in eight cases, six of which went to term.

Premature vs. Full-Term Child. (*Frühgeburt oder ausgetragenes Kind*) DR. NACKE, *Zentralblatt für Gynäkologie*, December 21, 1912.

Nacke questions the accepted measurements which determine premature and mature births. From his investigations full term babies were found to have abnormally greater weight and length measurements. The external development during the last four weeks of foetation makes almost negligible progress; whereas the development of the internal organs goes on to further completion. If the usual measurement, i. e., 49 to 50 cm. is accepted as evidence of maturity, we may be led in error in those cases of children which measure 56 cm. at term. These latter children form weeks before term can easily fulfill the ordinary length requirements and yet not be full term babies. This it seems to the author should be borne in mind in certain medico-legal cases.

The Treatment of Severe Menorrhagias Due to Acute Inflammatory Disease of the Adnexa by Injections Into the Portio. (of Pituitrin and Sekale) *Zur Behandlungen schwerer Menorrhagier bei akut entzündlicher Adnexerkrankungen, etc.*) C. KOCH, *Zentralblatt für Gynäkologie*, January, 4, 1913.

The severe hemorrhage due to inflammatory conditions of the adnexa are not readily controlled by the ordinary means. Even pituitrin injected subcutaneously has been disappointing. The injection of 1 ccm of pituitrin in a case of severe hemorrhage into the portio was followed by absolute cessation of bleeding for fully 48 hrs. A similar result was obtained by a derivative of ergot used in the same way. The latter however was associated with cramps and abdominal pain, which make it less desirable than pituitrin.

A Method to Cure Contracted Pelves. (*Verfahren zur Heilung enger Becken*) HEINRICH ROTTER, *Zentralblatt für Gynäkologie*, January 11, 1913.

Rotter describes an intraabdominal osteotomy for the permanent cure of contracted pelvis. He has practiced the method upon animals and upon the cadaver and also reports one case in the living, when the operation was done. The method consists in exposing the promontorium, the patient being in Trendelenburg posture, incising the parietal peritoneum over it and separating the wound edges by gauze sponges. The arteria sacrolis media is cut between two ligatures at a point 2 cm. above the promontory. With a chisel 4 cm. broad slightly concave and very sharp the promontory is easily cut away. The bone edges are smoothened, the subperitoneal fat united by two catgut sutures while the parietal peritoneum is sewed by continuous suture. The abdominal wound is then closed. The patient made an uneventful recovery and Rotter estimates the gain in the measurement of the true conjugate at from 1½ to 2 cm.

Laryngectomy for Cancer. By GEORGE W. CRILE, Cleveland, *The Laryngoscope*, December, 1912.

Crile claims that early cancer of the larynx is the most curable cancer of the body, because, first it is intrinsic, second, its diagnosis can be made early and third, the involvement of the lymphatic glands occurs late. He has performed 24 laryngectomies with a 7% operative mortality. The principle disabilities after operation are, the peculiar voice, the personal appearance of the patient and the predisposition to pulmonary troubles. Among the special dangers are pneumonia, local infection, mediastinal abscess, vagitis and reflex inhibition to the heart and respiration through interference with the superior laryngeal nerves. The question of the anesthetic is of a great deal of importance. A preliminary tracheotomy is made, into which is fitted rubber tubing going down into the trachea. This is connected with a special apparatus through which the ether is given. The author describes the operative technic for total or partial laryngectomy. The former is preferred.

Surgical experience has now demonstrated intrinsic cancer cannot invade hyaline cartilage; that metastasis seldom occurs; that cancer frequently follows benign tumors and syphilitic ulceration; that immediate mortality is well controlled; that disability and deformity are not important enough to have any weight in deciding for or against the operation and that if early recognized intrinsic cancer of the larynx is perhaps the most curable cancer of the body.

Technic of Intra-Nasal Operations Upon the Lacrimal Apparatus. By SIDNEY YANKAUER, New York, *The Laryngoscope*, December, 1912.

The author points out the definite relation of diseases of the nose to diseases of the lacrimal sac, and has devised an entirely new procedure, the details of which are as follows:

The patient is placed in a semi-recumbent position on the operating table and the nose is anesthetized with cocaine and adrenalin. An incision is begun at the anterior end of the attachment of the middle turbinate bone with an angular knife, and extends horizontally forward about half a centimeter and then is continued downward with an ordinary scalpel to the anterior end of the attachment of the lower turbinal, and then backward along the extreme edge of this bone for about two centimeters. This incision is made down to the bone, and the muco-periosteal flap elevated. The flap is turned backward, its upper part being tucked under the middle turbinate. The muco-periosteum is then separated from the outer surface of the turbinal in order to remove the anterior third of the bone. The nasal orifice of the canal is then located. The next step is the removal of the inner edge of the nasal orifice of the duct. This is a thick, hard piece of bone and is removed by a specially designed forceps. The anterior edge of the nasal orifice is now removed by a chisel or gouge. This must be done in thin shavings in order not to injure the antrum. The cut in the bone is deepened until the entire width of the membranous canal is clearly visible, then the entire membranous passage is slit open. The incision is begun at the lower edge of the muco-periosteum along the inner wall of the canal with a curved nasal scissors. If the fold of Hasner is well marked it is cut through with the scissors. The incision is carried up to the middle of the sac. The sac is opened by inserting a hook-shaped knife into it as far up as possible and then down to the neck. Adhesions are separated with a right angled probe. The mucous membrane of the outer nasal wall which during the entire operation had been tucked under the middle turbinate is now brought forward and returned to its original position. It can be held there by a single suture. After the operation, the nostril is packed with gauze which is removed at the end of 24 hours and the lacrimal passage is irrigated with normal saline solution.

Yankauer has operated upon the nine cases during the past three years, all of which were of long standing and in every case the suppuration ceased and there has been no recurrence.

Transplantation of a Piece of Cartilage in the Septum to Prevent Perforation After Sub-mucous Resection. By RICHARD H. BROWN. *The Laryngoscope*, December, 1912.

The author, in cases where a perforation seemed imminent, has seen fit to take a small piece of cartilage he had just removed from the nose in a sub-mucous resection, and has inserted it between the flaps, shaping it in such a way as to meet the special requirement. This protects the opening in the mucous membrane in the process of healing. Eventually the transplanted piece of bone becomes absorbed. The result is excellent in preventing a permanent perforation.

Large Papilloma of the Epiglottis Removed by Fulguration. By RICHARD H. JOHNSTON. *The Laryngoscope*, December, 1912.

The patient, 68 years old had a cauliflower-like mass filling the supraglottic space. The greater part of the tumor was removed with forceps. A few days later by direct laryngoscopy, the remains of the tumor could be seen attached to the right lower epiglottis. The high-frequency spark was applied thoroughly through the laryngoscope. One week later the patient returned showing only a few tags at the site of the tumor. A second application was given and a week later no signs of the growth could be seen, the larynx appearing normal. The author thinks that this method could be used in cases of multiple papilomata in children.

After-Treatment of Operations Upon the Thyroid Gland. RUSSELL S. FOWLER, Brooklyn, N. Y., *Long Island Medical Journal*, January, 1913.

Fowler enumerates the various accidents and difficulties which may arise after thyroid operation and suggests various procedures to be employed. In cases which have lost considerable blood or in exophthalmic cases he recommends the use of saline solution by hypodermoclysis or by the rectum. Often symptoms of hyperthyroidism, such as fever, headache, nervousness, tachycardia, may be relieved by reopening the wound and allowing some of the retained thyroid secretion to escape. In such cases also salt solution in large amounts under the skin is advocated. Occasionally a post-operative hemorrhage occurs and the blood may extend upward beneath the deep fascia giving rise to suffocative symptoms. Treatment of this condition consists in opening the wound by removing a few of the sutures and allowing the retained blood to escape. Post-operative tetany should be treated by feeding with parathyroid glands, injection of emulsion of parathyroid, and intravenous injection of saline solution. These measures are of use in tiding over the patient when all the parathyroid glands have not been removed, but only injured. If a malignant new-growth necessitates removal of the entire thyroid gland, feeding with thyroid preparations should at once be begun in order to avoid post-operative myxedema.